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Fiscal Year 2003 Ecological Monitoring Annual Report

Idaho Completion Project

Bechtel BWXT Idaho, LLC

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Idaho Completion Project
Idaho Falls, Idaho 83415

Prepared for the
U.S. Department of Energy
Assistant Secretary for Environmental Management
Under DOE Idaho Operations Office
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ABSTRACT

This report summarizes the results of the long-term ecological monitoring activities completed during Fiscal Year 2003 at the Idaho National Engineering and Environmental Laboratory. During Fiscal Year 2003, the objectives were to establish the baseline data set and to monitor and evaluate the effectiveness of remedial actions for key ecological receptors. The field team collected samples of surface and subsurface soil, sagebrush, crested wheatgrass, and deer mice for assorted radionuclides, metals, nitroaromatics, soil fauna, histopathic, earthworm toxicity, and plant toxicity laboratory analyses. The team also collected small mammal and vegetation population data, and small mammal body weight to kidney weight ratio data. These results are in draft form and will be part of a baseline ecological data set expected to take five years to become functional.

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ACRONYMS

DOE-ID	U.S. Department of Energy Idaho Operations Office
EPA	U.S. Environmental Protection Agency
FY	fiscal year
INEEL	Idaho National Engineering and Environmental Laboratory
L&V	limitation and validation
LTEM	long-term ecological monitoring
ORD	ordnance
RDX	cyclotrimethylene trinitroamine
ROD	Record of Decision
SAM	Sample & Analysis Management
TNT	trinitrotoluene
TRA	Test Reactor Area

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1. INTRODUCTION

In Fiscal Year 2003 (FY-03) the long-term ecological monitoring (LTEM) project began collecting and analyzing samples at the Idaho National Engineering and Environmental Laboratory (INEEL) in accordance with the requirements in the *Record of Decision–Experimental Breeder Reactor-I/Boiling Water Reactor Experiment Area and Miscellaneous Sites, Operable Units 6-05 and 10-04* (ROD) (DOE-ID 2002). This report summarizes the first year's results of a baseline data set that will take five years to collect. Ultimately, LTEM will use the baseline data set to help focus future sampling efforts and to help determine if observed biological responses resulted from legacy contamination, restoration activities, or natural processes.

From the broadest to most specific, three documents govern the LTEM activities on the INEEL, including the final ROD (DOE-ID 2002) and the *Long-Term Ecological Monitoring Plan for the Idaho National Engineering and Environmental Laboratory* (INEEL 2004), and the yearly field sampling plan. The ROD specified the broad need for ecological monitoring on the INEEL. Based on the ROD requirements, the LTEM plan specified, by year, the planned data collection areas and types of data to be collected. The *Long-Term Ecological Monitoring Field Sampling Plan for 2003* (INEEL 2003) details all aspects of data collection at the Ordnance (ORD) Group #1 areas (Fire Station II Zone and Range Fire Burn Area, National Oceanic and Atmospheric Administration Grid, and Experimental Field Station), Test Reactor Area (TRA), and two terrestrial reference areas.

During planning stages, the LTEM project was interested in using nearby kipukas to collect background data with which to compare data collected from potentially contaminated INEEL sites. Kipukas are areas of relatively pristine sagebrush steppe surrounded by lava flows. As discussed in Appendix A, however, it was determined that using kipukas as background reference sites would not be appropriate.

Two additional studies were performed as part of the FY-03 activities. The first study, included as Appendix B, is an evaluation of a portable gamma-ray spectrometer system capable of determining concentrations of gamma-ray emitting radionuclides in soil. The second study is a paper evaluation of the impacts to the LTEM project and the INEEL if sage grouse become listed as a threatened and endangered species. The most current petition for listing was initiated in December 2003. As discussed in Appendix C, sage grouse listing would impact the Sitewide ecological risk assessment results and current activities at the Site.

As directed by the ROD (DOE-ID 2002), in FY-03, LTEM collected both analytical data and effects data. The analytical data included biotic, (e.g., whole mice and plant tissues), and abiotic (i.e., soil) samples. The effects data ranged from vegetative cover surveys and small mammal population estimates to histopathologic studies of captured mice. Histopathology is a branch of science concerned with the tissue changes characteristic of disease. The analytical data is summarized in Section 2 and the effects data in Section 3. The data collected, and the location, is summarized in Table 1. The associated limitations and validation (L&V) reports generated to support this project are in Appendix D.

Table 1. Sampling performed in Fiscal Year 2003 at each location.

	Ordnance Area 1	TRA	Reference
	Analytical Data		
Surface Soil (0–2 in.)	Radionuclides, nitroaromatics, metals	Radionuclides and metals	Will be collected in FY-04
Subsurface soil (6–24 in.)	Radionuclides, nitroaromatics, metals	Radionuclides and metals	Will be collected in FY-04
Sagebrush	Radionuclides, nitroaromatics, metals	Radionuclides and metals	Will be collected in FY-04
Crested wheatgrass	Radionuclides, nitroaromatics, metals	Radionuclides and metals	Will be collected in FY-04
Biota (deer mice)	Radionuclides, nitroaromatics, metals	Radionuclides and metals	Will be collected in FY-04
	Effects Data		
Small mammal population	Trapping at all plots for two weeks	Trapping at all plots for two weeks	Trapping at all plots for various times up to two weeks
Vegetation population sampling	50 Daubenmire plots collected at each plot	50 Daubenmire plots collected at each plot	50 Daubenmire plots collected at each plot
Deer mice histopathic data	5–10 samples per plot of both kidney and liver	5–10 samples per plot of both kidney and liver	Will be collected in FY-04
Earthworm toxicity	One sample per plot	One sample per plot	Will be collected in FY-04
Plant toxicity	One sample per plot	One sample per plot	Will be collected in FY-04
Soil fauna	Sampled collected too late in season	Samples collected too late in season	Will be collected in FY-04
Deer mice genetics	Not collected in FY-03	Not collected in FY-03	Will be collected in FY-04
Deer mice body to kidney weight ratios	5–10 samples per plot	5–10 samples per plot	Will be collected in FY-04

2. ANALYTICAL RESULTS

To characterize contaminant concentrations, LTEM collected soil, plant, and animal samples in potentially contaminated sites. During FY-03, samples were collected and analyzed for concentrations of contaminants in various media as listed in Table 1. The analyses were performed in accordance with the ER-SOW-394, 2002, "Idaho National Engineering and Environmental Laboratory Sample and Analysis Management Statement of Work for Analytical Services," Rev. 1, December 2002. This document establishes the required detection limits and quality assurance requirements for the analytical methods to be employed. All analytical results underwent a cursory review by a Sample and Analysis Management (SAM) chemist under the guidance of GDE-7003, "Levels of Analytical Method Data Validation." The cursory review process checked to ensure that: (1) the analyses requested in the task order statement/scope of work were performed and reported; (2) authorized analytical methods were used; (3) analysis holding times were met; and (4) the contractually agreed-upon turnaround times were met. In conjunction with the cursory review, SAM data management personnel performed checks to verify the data entered into Integrated Environmental Data Management System, an INEEL database containing environmental sampling results, are the actual values reported on the laboratory data report (transcription error checks).

The analytical contaminant data were summarized for average, minimum, and maximum by area. This information is included in Appendix E. The following sections present these data summarized by media and area. Only a preliminary assessment of these data was performed. This analysis is limited at this time because the reference area sampling will be done in 2004 and no comparison to background is currently available. These data will be further analyzed against the reference area after the initial data collection, as per the LTEM Plan (INEEL 2004).

Surface and subsurface soil samples were collected from both the ORD1 and TRA sampling areas. All soil samples were analyzed for inorganics and radionuclides. Soil samples from ORD1 were also analyzed for organics (explosives and derivatives). The discussions below are directed at the average concentrations across each site and do not address individual plot variation.

2.1 Radionuclides

Twenty-one radionuclides were analyzed within samples of surface soil, subsurface soil, grass, sagebrush, and deer mice.

Of the radionuclides reported in soil samples from ORD1 and TRA, only Cs-137 and the common naturally occurring radionuclides (K-40, isotopes of U, Th, Ra) were present in concentrations above 1 pCi/g. At both sites, Cs-137 activities were substantially higher in surface soils in comparison with subsurface soils. Traces of other radionuclides (Sr-90, Eu-154, Co-60) were also present in the soil.

The majority of plant samples contained only naturally occurring radionuclides, with K-40 being present in all the samples, and traces of other naturally occurring radionuclides (U, Th, Ra) being present in a small number of samples. In a small number of samples, Sr-90, Am-241, Cs-137, Pu-239/240, and Co-60 were detected, but concentrations of Sr-90 exceeded 1 pCi/g in only one TRA sagebrush sample, and Am-241, Cs-137, and Co-60 exceeded 1 pCi/g in only one ORD1 crested wheatgrass.

Naturally occurring K-40 was the most commonly observed radionuclide in mice. Traces of Am-241 were detected in three deer mice. The radionuclides Zn-65, Co-60, Sr-90, and Cs-137 were detected in a small number of mice, but the Zn-65 is suspect and will be further evaluated.

Figures 1 through 4 (TRA ab and ORD ab) graphically present the relationship of selected detected radionuclides between media and areas.

2.2 Inorganics

The inorganics assessed include arsenic (As), beryllium (Be), cadmium (Cd), lead (Pb), mercury (Hg), and zinc (Zn). Figures 5 and 6 (TRA and ORD) graphically present the relationship of the inorganics between media and areas. A summary is as follows:

- As: Mean concentrations of As were slightly higher at TRA (compared with ORD1) and slightly higher in subsurface (compared with surface) soils. The higher concentrations in the subsurface soils may be due to dilution in surface layers by higher organic components. All of the sagebrush samples and many of the CWG samples were below detection limits for As. As was below detection limits in the deer mice.

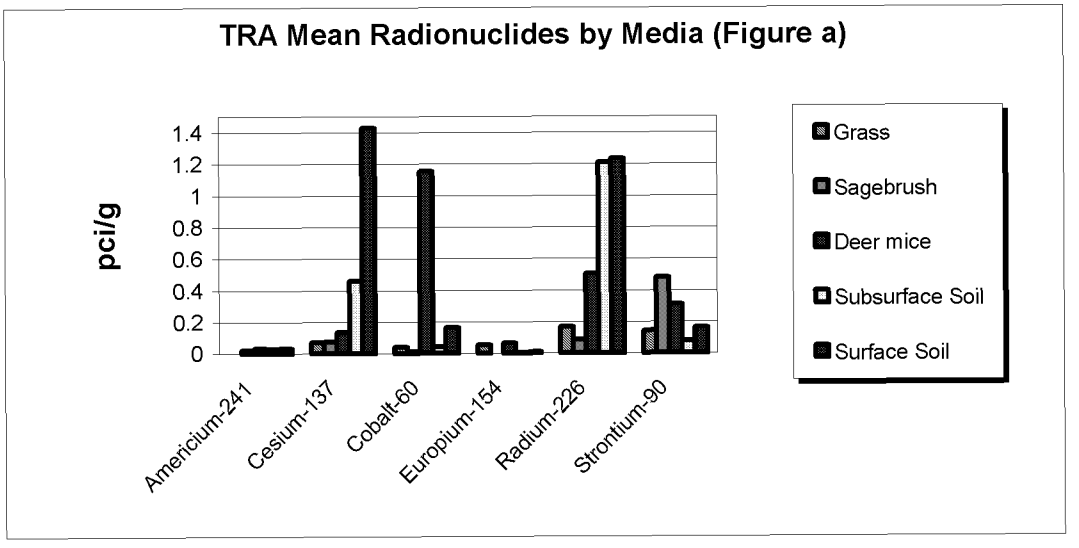

Figure 1. Test Reactor Area mean radionuclides by media (Figure a).

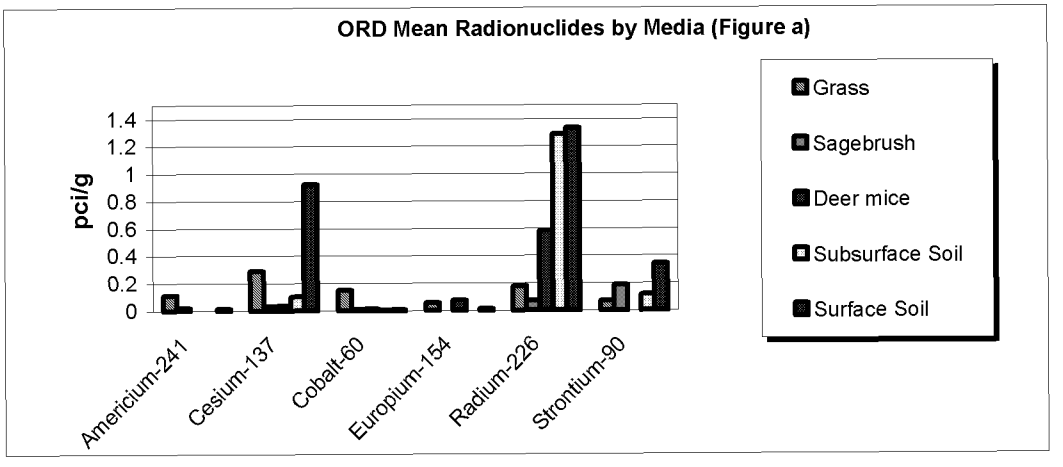

Figure 2. Ordnance mean radionuclides by media (Figure a).

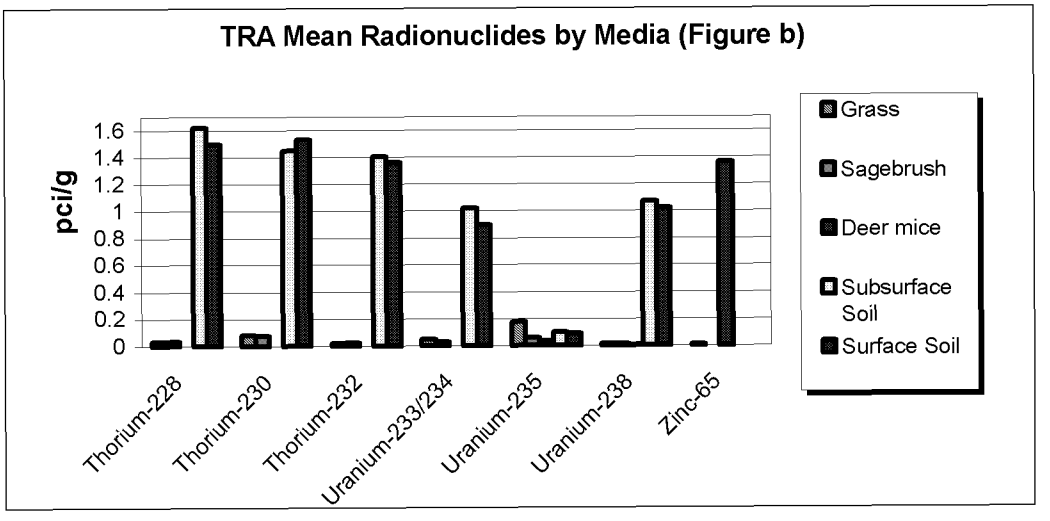

Figure 3. Test Reactor Area mean radionuclides by media (Figure b).

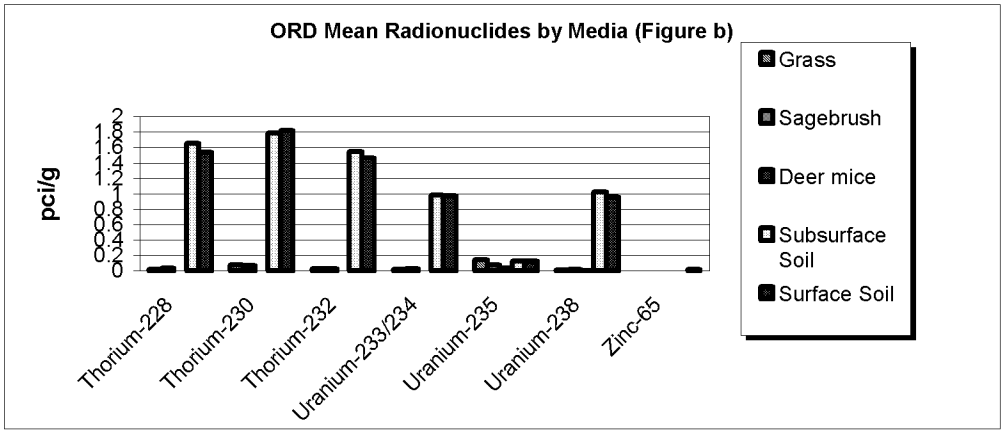

Figure 4. Ordnance mean radionuclides by media (Figure b).

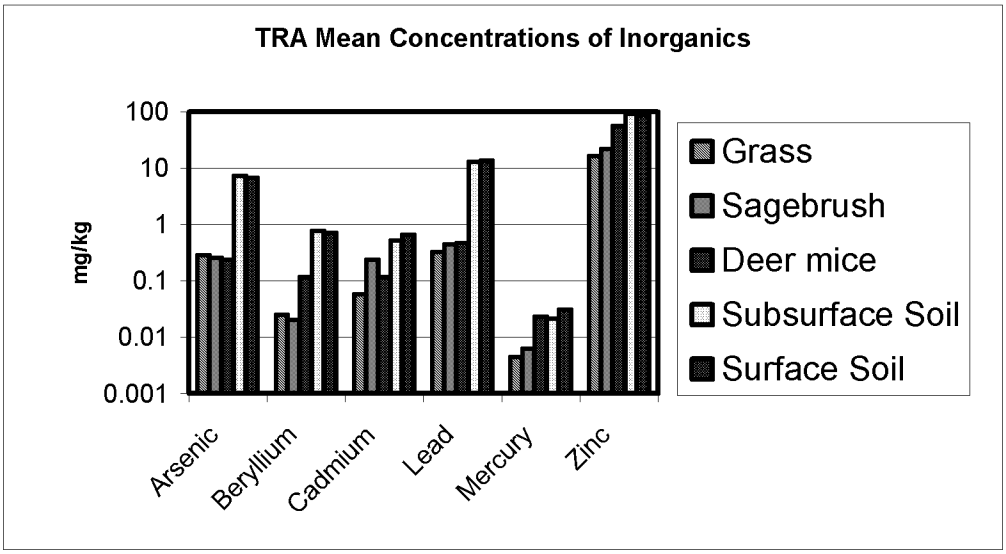

Figure 5. Test Reactor Area mean concentrations of inorganics.

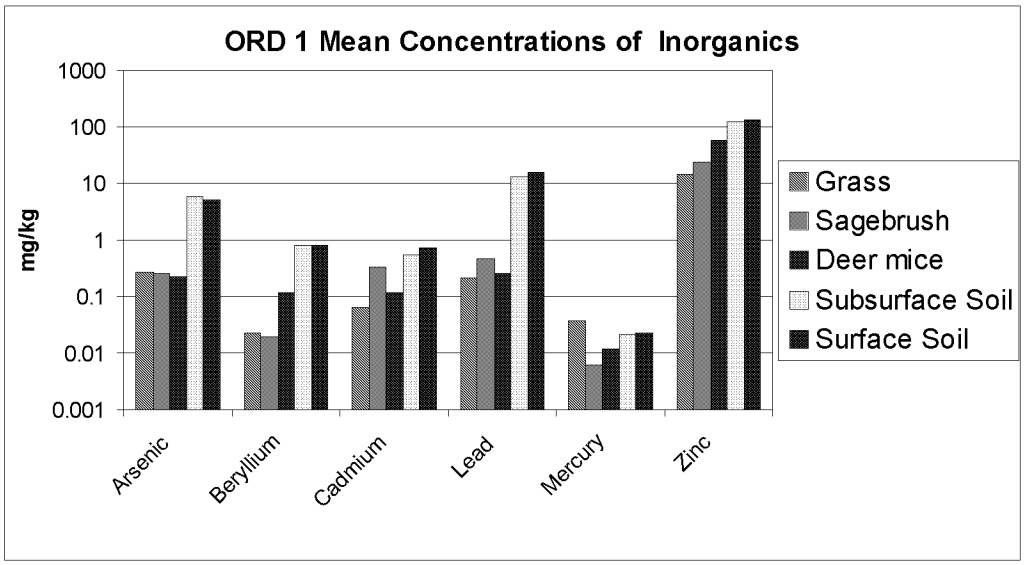

Figure 6. Ordnance Area 1 mean concentrations of inorganics.

- Be: Be concentrations do not appear different between sites or between surface and subsurface. In the plants, there appears to be a transcription error in the data for Be and Cd: the values for each are identical on a sample-by-sample basis. This is being checked. Whichever element is presented correctly is below detection limits in CWG, but generally above detection limits in sagebrush. Be was no detected in deer mice.

- Cd: Concentrations of Cd tended to be higher in surface versus subsurface soils. Concentrations in samples from TRA were similar to those from ORD1. In the plants there appears to be a transcription error in the data for Be and Cd: the values for each are identical on a sample-by-sample basis. This is being checked. Cd was not detected in deer mice.

- Pb: Lead concentrations were slightly higher in surface (vs. subsurface) and in soils from ORD1 (vs. TRA), although these differences may not be statistically significant. It does not appear to reflect the deposition of Pb from regional atmospheric pollution. Samples of CWG from both areas are mostly below detection limits for Pb. Sagebrush samples are all above detection limits. Mean values are virtually identical for sagebrush between ORD1 and TRA. Pb appears to be higher in deer mice from the TRA area, although detailed statistical analysis has not been performed.

- Hg: Concentrations of Hg did not appear to vary between sites or between surface and subsurface. It does not appear to reflect the deposition of Hg from regional Hg deposition. Hg appears to be higher in deer mice from the TRA area, although detailed statistical analysis has not been performed.

- Zn: As a base cation and common component of soils, it is not surprising concentrations of Zn are higher than those of other metals. It does appear that soils from ORD1 are higher in Zn than those from TRA, but this could be a natural phenomenon. Concentrations of Zn in both CWG and sagebrush are considerably higher than the other metals listed above, and detection limits are not a problem for this metal. This is not unexpected, as Zn is a plant micronutrient, indicating that it will tend to be accumulated by plants. Mean Zn concentrations are similar between species and between areas. Mean Zn concentrations were similar between sites.

2.3 Organics

The ORD 1 area samples were analyzed for seven organic compounds of concern. Only three were detected in soil. In surface soil, TNT was detected at 2 plots, 2-amino-4,6 dinitrotoluene at 2 plots, and 4-amino-3,6 dinitrotoluene at 1 plot. Crested wheatgrass and sagebrush samples from the ORD1 area were analyzed for nitroaromatic compounds. These data were basically useless due to issues with the detection limits (see Appendix E). This will be corrected in FY-04. Unexpectedly, deer mice in three plots had detections of RDX. This will be evaluated further on a plot-by-plot basis in the final report. Organics will not be graphically presented.

3. EFFECT RESULTS

The LTEM conducted sampling to help determine if adverse effects to plants and wildlife are occurring on the INEEL. To do this, LTEM sampled and analyzed indicator species of plants and wildlife in potentially contaminated INEEL sites and uncontaminated reference areas.

3.1 Earthworm Bioassay Analyses

Earthworm bioassays are a widely recognized tool for evaluating the toxicity of contaminated soils. In this protocol, earthworms (*Eisenia foetida*) were added to soil samples collected from TRA and ordnance area sites. The primary test endpoint is earthworm mortality, recorded on Day 14. Earthworm bioassays were conducted with site soils. Survival and growth (indicated as body weight change) were the endpoints monitored.

Figure 7 shows the survival as a proportion of total beginning the 14-d test. Survival was slightly lower in the site soils. This was due primarily to 53% average mortality at one of the ORD1 sites. Body weight increased in the laboratory controls was nearly unchanged in TRA soils, and decreased in soils from ORD (see Figure 8). All onsite samples were statistically significant from the laboratory controls (JAS-66-04). Whether this is due to soil physical properties such as total organic carbon, or due to chemical contamination, cannot be determined without statistical comparison to the soil chemistry data and to data from a site-specific reference area.

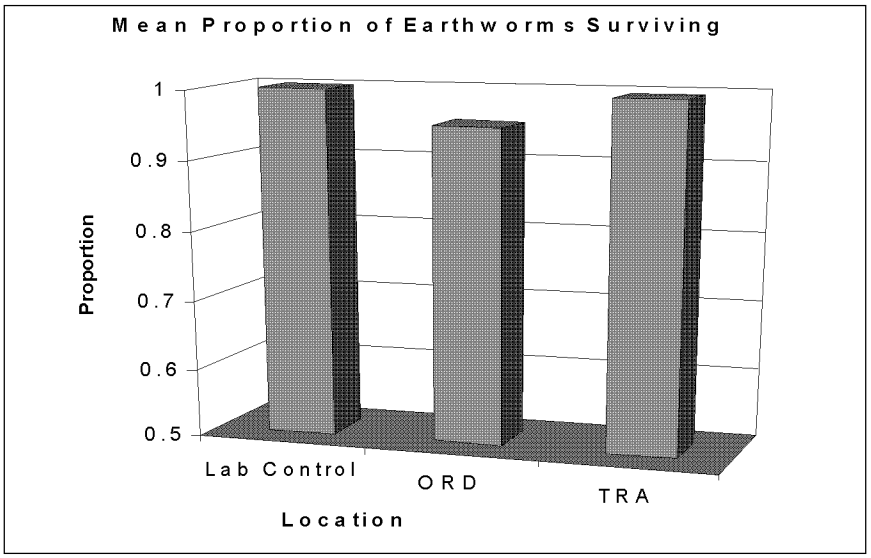

Figure 7. Earthworm survival by location.

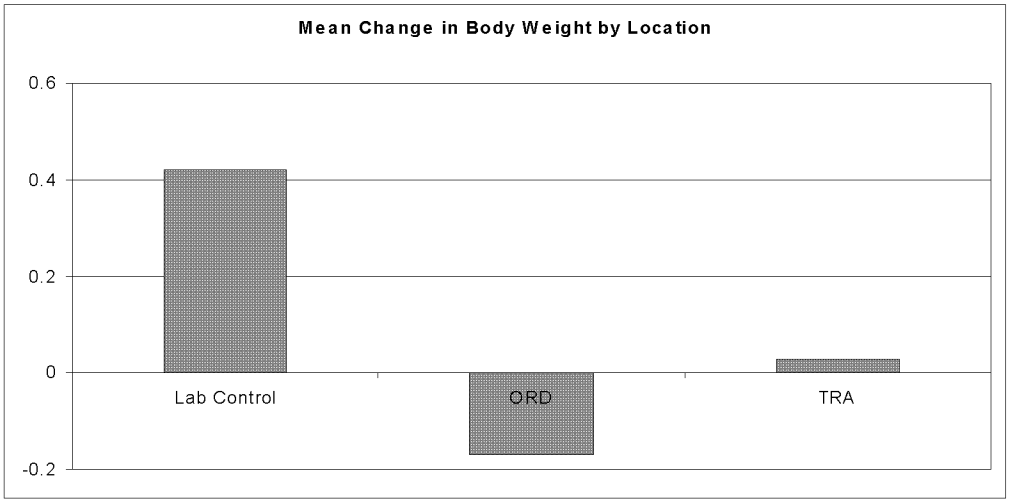

Figure 8. Change in body weight by location.

3.2 Kidney and Liver to Body Weight Ratios

For those mice used for histopathic studies, the kidney and livers were weighed for comparison to body weight. Trinitrotoluene (TNT) and cyclotrimethylene trinitroamine (RDX) are two munitions compounds that occur in the INEEL environment. The U.S. Army Center for Health Promotion and Preventative Medicine (USACHPPM 2000) reports increased liver and kidney weights, which are indicative of organ injury in rats at doses greater than 2 mg/kg/d for rats and 32 mg/kg/d for dogs. RDX can cause altered organ weights in animals; however, no evidence of teratogenic toxicity is found (EPA 2003).

As can be seen in Table 2, the body, liver, and kidney weights appear lighter at TRA. However, the liver and kidney ratio are slightly higher at TRA. This information is difficult to interpret without the reference area, which will be collected in FY-04. This is shown graphically in Figure 9.

Table 2. Deer mice body, liver, and kidney weight and ratios.

	Body Mass (g)	Liver (wt)	Kidney (wt)	Liver/body (wt)	Kidney/body (wt)
TRA	13.490	0.860	0.245	0.064	0.019
ORD#1	15.786	0.888	0.265	0.056	0.017

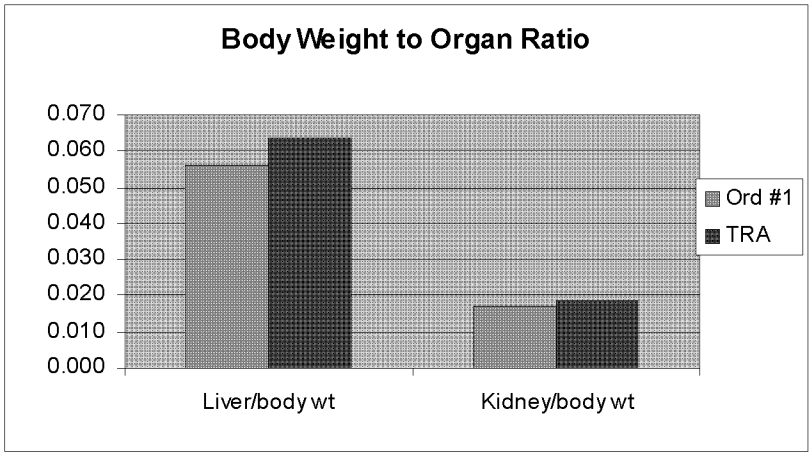

Figure 9. Body weight to organ ratio in deer mice.

3.3 Plant Toxicity Tests

Plant toxicity tests were conducted with site soils using five species: carrots, corn, onions, radishes, and soybeans. Germination, mortality, and growth were measured as endpoints to determine if site soils were toxic to plants.

Figure 10 shows the mean number of plants that emerged per location across all six replicates for each sample. The mean number of plants that emerged tended to be slightly higher for lab controls than for site soils. Emergence is related to germination rate (Figure 11) as the number emerged divided by the total number of seeds planted. Germination rate was lowest for onion. Germination rates for corn and radish at TRA appear to be lower than lab controls.

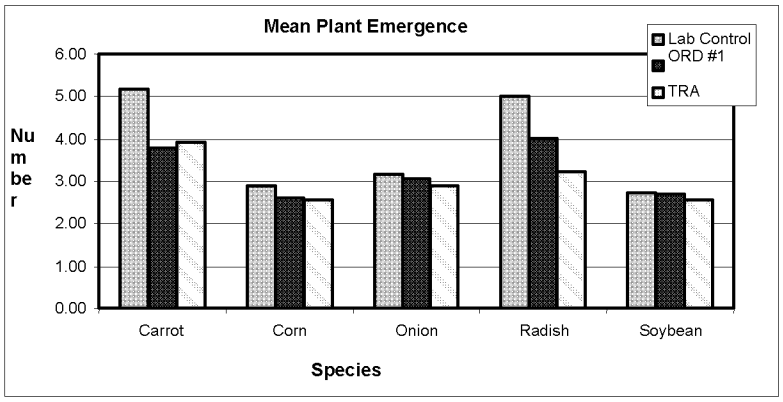

Figure 10. Mean emergence by species.

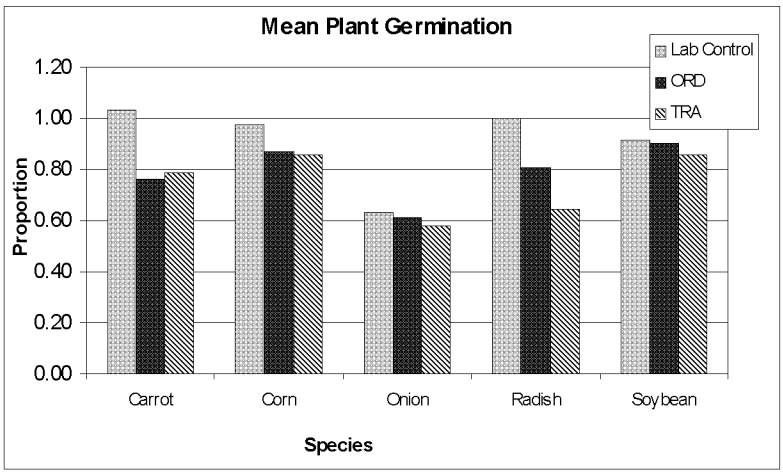

Figure 11. Mean germination rate by species.

Corn, radishes, and soybeans exhibited low mortality rates; other species had no mortality. Mortality was slightly higher in site soils compared to laboratory controls (Figure 12). Figure 13 indicates that there is no apparent trend in growth compared to laboratory controls; if anything, plants grew slightly better in site soils. For carrots, corn, and soybeans, root growth (see Figure 14) was slightly better in laboratory artificial soils than site soils. Figures 15 and 16 present the mean aboveground and belowground biomass, respectively. Soybeans at ORD had a higher aboveground biomass than at other locations, and corn at ORD had a higher belowground biomass.

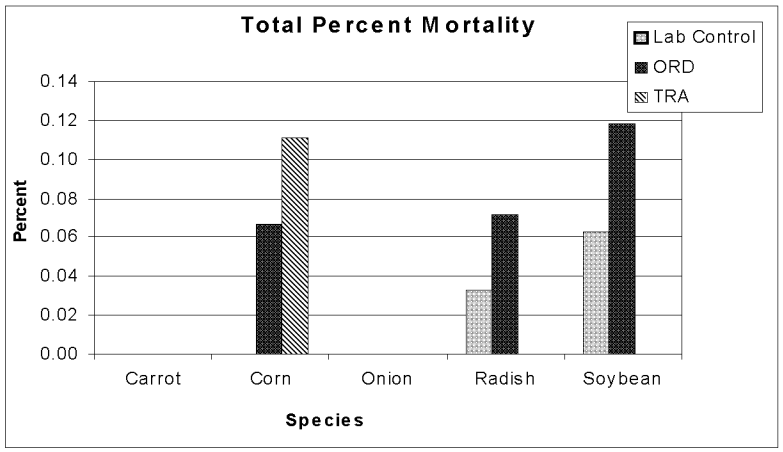

Figure 12. Mortality by species.

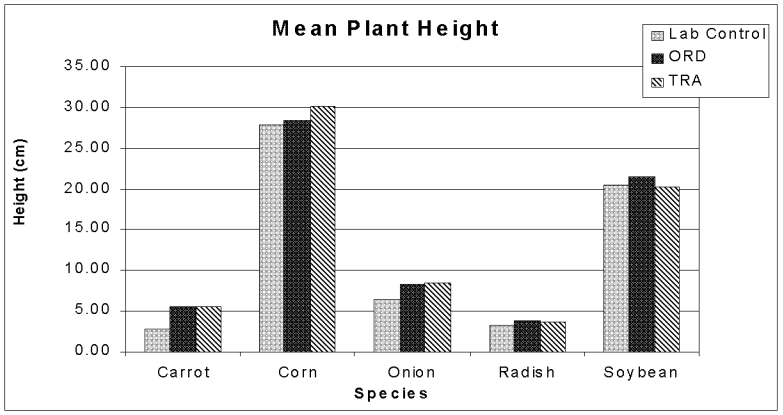

Figure 13. Mean plant height by species.

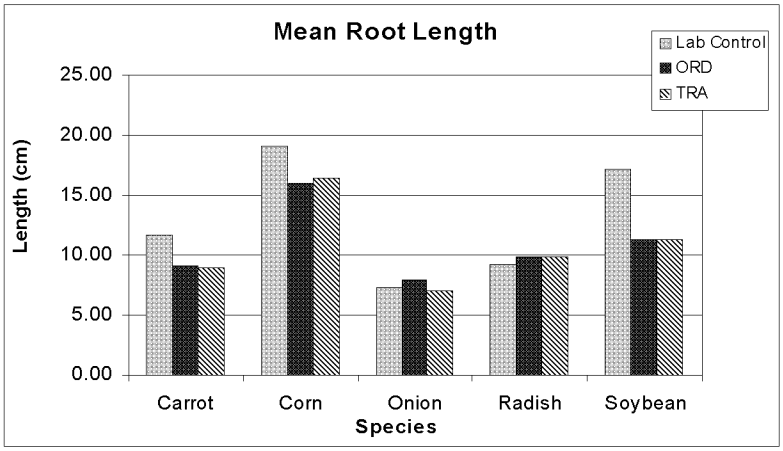

Figure 14. Mean root length by species.

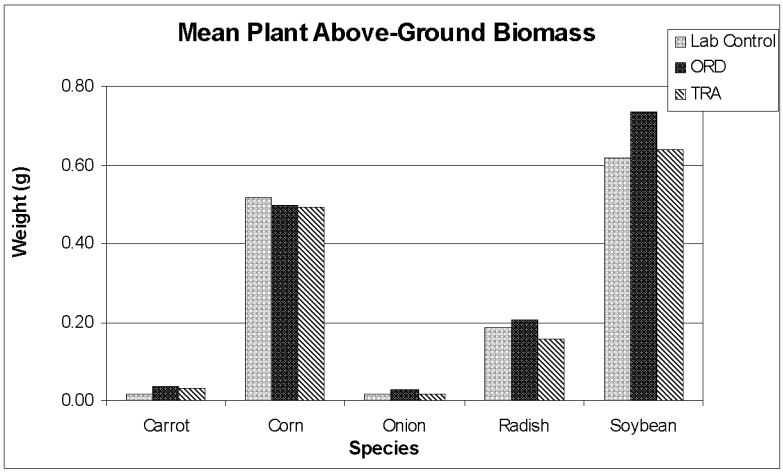

Figure 15. Mean aboveground biomass by species.

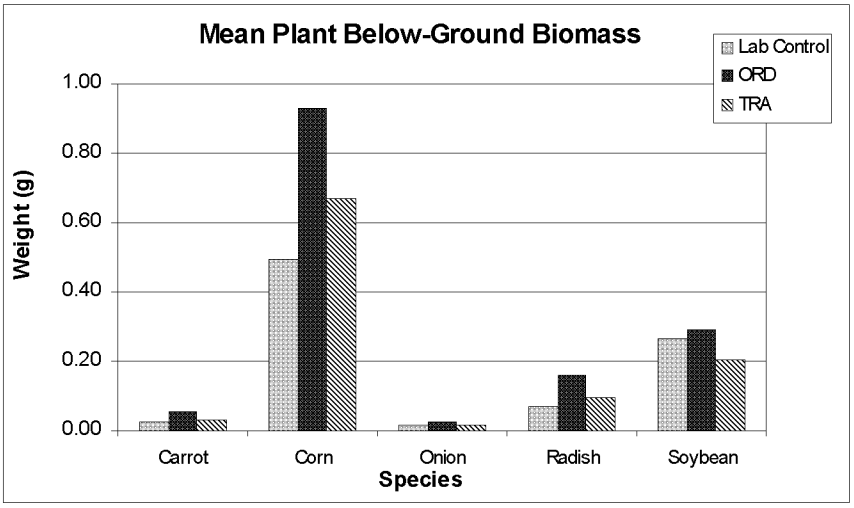

Figure 16. Mean belowground biomass by species.

The plant bioassay endpoints need to be compared to soil concentrations to determine if there is any correlation. Statistical analysis of the data needs to be performed in order to determine if the differences observed are statistically significant.

3.4 Histopathic Analyses

Certain toxicants can affect the morphology of cells, causing inflammation, necrosis, and other visual changes. Histopathology can identify such changes in cellular structure and in levels of parasitism. Histopathology results were obtained for 50 deer mouse liver and kidney samples from TRA and 50 from ORD by Dr. Gene Hubbard at Southwest Research Institute. Five animals from each of the 10 subareas were sampled. There were occasional samples of spleen submitted as well. The pathologist rated each sample according to type of lesion and severity of lesion (Figure 17). Tissues were only available for ORD and TRA, as reference locations were not sampled.

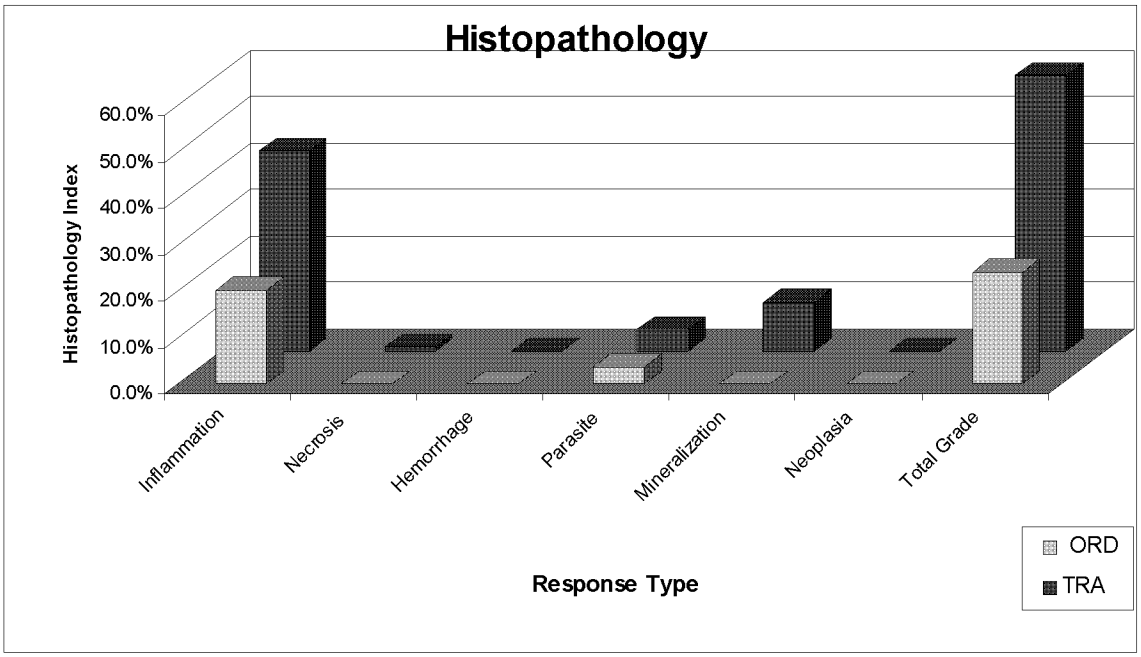

Figure 17. Summary of histopathology results by location.

There was a greater severity of lesions in samples from TRA. There were no lesions in spleen samples. Most lesions were in liver samples. Without reference area data for wild populations, it is not known if the differences are reflective of toxicity or due to natural variation.

The pathologist did not note many lesions that would be considered specific to acute chemical toxicity (i.e., cell death or necrosis). However, a chemical insult that affected immune function could potentiate viral inflammation, which was observed. Additional tests to determine immune status (i.e., CBC, standard hematological profile) would need to be performed to determine if immune status was affected.

3.5 Soil Fauna Data

The results for the analyses of 20 soil samples for the mesoarthropod test. Arthropods are separated by Berlese extraction from the soil samples. Generally, the results from Berlese extractions allow determination of arthropod biodiversity and abundance, and may help determine what, if any, impact soil contamination is having on the arthropod community. Unfortunately, no arthropods were present in the soil provided to the laboratory, possibly because of hot weather during sampling.

3.6 Plant Population Data

The Daubenmire method is used to estimate percent ground cover using a quadrat frame. As the quadrat frame is placed along sampling plots at specified intervals, field team members estimate the canopy coverage of each plant species, bare ground, rocks, and litter using the ranges shown in Table 3.

Table 3. Plant cover classes.

Coverage Class	Range of Coverage (%)	Midpoint of Range (%)
1	0 to 5	2.5
2	6 to 25	15.0
3	26 to 50	37.5
4	51 to 75	62.5
5	76 to 95	85.0
6	95 to 100	97.5

The team completed 50 quadrat surveys at each of sampling plots. Using these data, LTEM estimated the species cover at each plot by multiplying the number of times a class was recorded by the midpoint of that cover class, adding the results for each class, and calculating an average by dividing by the total number of quadrats sampled.

The summary of the percent cover by plots and species is presented in Appendix F. This information is summarized by percent cover by growth form in Figure 18. The plant composition data will be used in conjunction with the small mammal data to evaluate the habitat and provide a baseline for trending of condition. This evaluation will be performed in the report provided at the end of the overall five-year data collection.

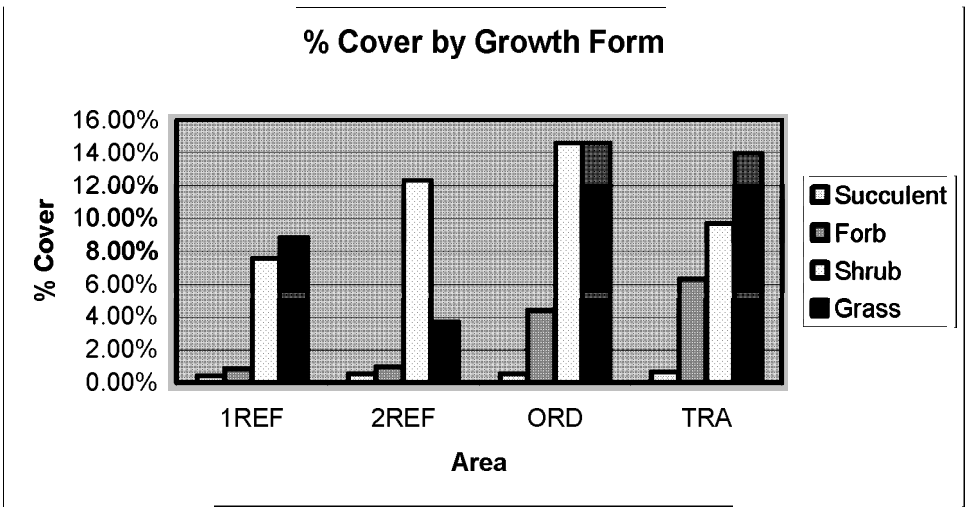

Figure 18. Percent cover by growth form and area.

3.7 Mammal Population Data

The general aim is to monitor variability in reproductive and survival performance of the species of concern. To investigate these variations entail several seasons of fieldwork on reasonably large samples of small mammals. The program entails capturing, measuring body parameters, individually tagging, recapturing, and releasing small mammals. Table 4 presents the number of small mammals captured and released by locations. Future assessment of the populations will be performed on this data as part of the final report. Although populations are not considered sensitive indicators of effects, it is important to

relate these data to other possible indicators. The basic mammal data will be used to detect any possible population effects and to support the development of a baseline for future trending.

Table 4. Small mammals caught and released by location.

Species Trapped	1REF	TRA	ORD	2REF	Total
Dipodomys ordii (Ord's Kangaroo Rat)	15	61	30	9	115
Lagurus curtatus (Sagebrush Vole)	3	0	4	0	7
Neotoma cinerea (Bushy-tailed Woodrat)	2	1	0	0	3
Onychomys leucogaster (Grasshopper Mouse)	5	20	27	16	68
Peromyscus maniculatus (White-footed Deer Mouse)	165	536	304	112	1,117
Perognathus parvus (Great Basin Pocket Mouse)	23	22	51	6	102
Spermophilus townsendii (Townsend's Ground Squirrel)	7	4	1	0	12
Tamias minimus (Least Chipmunk)	17	89	96	74	276
Reithrodontomys megalotis (Harvest Mouse)	0	3	0	0	3
Sylvilagus nattallii (Mountain Cottontail)[a]	0	1	0	0	1
Mustela frenata (Long-tailed Weasel)[a]	0	1	0	0	1
Total	237	738	513	217	1,705

a. Not tagged.

4. LESSONS LEARNED

Heat was a significant issue during the summer collection. Additional crew members will be available in FY-04 to assist in clearing traps more quickly in the cooler morning hours, which should minimize trap mortality.

Due to problems with the method for evaluating RDX and TNT concentrations in plants, the detection limits were extremely high. New methods for detecting RDX and TNT in plants are being evaluated.

Misidentification of plants and animals is always a concern. Additional training will be offered to assist in eliminating this potential problem.

Due to the laboratory space that was used in FY-03, the kidney and liver weights may have been inaccurate. In FY-04, the project obtained access to a laboratory trailer that should eliminate this problem.

The laboratory did not see any soil microfauna in the bulk soil samples provided in FY-03. In FY-04, an Idaho State University researcher will instruct samplers in a method that helps ensure better recovery of the soil fauna.

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Appendix A

Kipukas as Reference Areas for Assessing Population- and Community-Level Effects

Appendix A
Kipukas as Reference Areas for Assessing Population- and Community-Level Effects

A-1. INTRODUCTION

The purpose of this report is to provide background information on *kipukas*, and to summarize concerns regarding the use of kipukas as reference areas for monitoring the effects of environmental contamination or other anthropogenic disturbance at the Idaho National Engineering and Environmental Laboratory.

A-2. BACKGROUND

Kipuka is the Hawaiian word for "island," although the word is generally used in reference to terrestrial areas containing pristine remnants of native vegetation surrounded by lava flows. In effect, a kipuka may be viewed as an island surrounded by (but not covered by) lava rather than water. The lava flows of eastern Idaho contain numerous kipukas of varying sizes. One of the largest is the Carey kipuka in Craters of the Moon National Monument, which is approximately 180 acres in size. Kipukas are of particular scientific interest because they preserve pristine remnants of native vegetation often only minimally affected by fire, grazing, or other anthropogenic disturbances. Some kipukas in eastern Idaho have been converted to agriculture, although many, especially the smaller ones, remain relatively undisturbed. The pristine nature of kipukas makes it tempting to use them as reference areas to observe changes in the structure and function of ecological communities in the surrounding region.

Biogeography is the study of how geography affects the structure and function of ecological systems. ***Island biogeography*** is a theory used to explain and predict the composition of ecological communities on islands (MacArthur and Wilson 1967). Among the basic tenets of the theory of island biogeography is that the number of species living on an island is strongly influenced by two factors: (1) the size of the island, and (2) the distance of the island from other land. In general, smaller islands are capable of supporting fewer species than larger islands. Similarly, islands that are more isolated generally exhibit reduced rates of immigration and therefore show a lower number of species present.

Although kipukas are not truly islands (i.e., not surrounded by water), the manner in which they are isolated from related "mainland" plant communities is similar to that of islands in many respects, enough that the theory of island biogeography has often been applied to kipukas. For true islands, water serves as a nearly impassable barrier for most terrestrial species, and the introduction of new species to islands is therefore very slow. Lava flows surrounding kipukas also serve to isolate the communities within the kipuka, although these barriers are generally not as impassible as water surrounding islands. Despite this difference, the theory of island biogeography is generally applicable to kipukas.

One notable kipuka study conducted in eastern Idaho involved observations on mammal and lizard populations and vegetation communities in kipukas at Craters of the Moon National Monument southwest of the INEEL (Lovejoy 1980). In this study, 14 kipukas ranging in size from 0.16–3.6 hectares and isolated from surrounding areas by 70–1,800 meters of lava were included. This study found that the degree of isolation for kipukas of similar size did not affect the number of species present for either plants or animals, concluding that the lava apparently did not provide a broad enough barrier to prevent dispersal of plants and, to a lesser degree, animals.

A-3. CONCERNS WITH USING KIPUKAS FOR EFFECTS MONITORING

The general problem with using kipukas as reference areas for monitoring effects from anthropogenic activities in nearby "mainland" areas is that the ecological communities within kipukas may be substantially different from those in the nonkipuka areas. These differences will make it substantially more difficult to separate anthropogenic impacts (i.e., the effects that are being evaluated) from differences inherent to the kipuka. Below is a partial list of the specific problems related to the use of kipukas.

1. ***General habitat differences:*** Kipukas are not generally identical to the surrounding "mainland" in terms of habitat characteristics. Some of the differences are related directly or indirectly to the limited size of kipukas. Beyond this, there are likely to be other subtle (or even dramatic) differences in vegetation cover and diversity, soil type, and other factors making kipukas more or less favorable for an individual small mammal species. Lovejoy (1980) pointed out that there might be a lack of suitable habitat on kipukas for some species that are common in "mainland" areas, using Ord's kangaroo rat as an example. This is a burrowing species generally associated with sandy soils, and was generally absent in the kipukas examined by Lovejoy.

2. ***Lava use:*** Some small mammal species are capable of residing in the lava surrounding a kipuka, whereas other species are not. For example, Lovejoy (1980) observed that cottontails, chipmunks, and bushy-tailed woodrats were common within the lava flows, whereas Great Basin pocket mouse, Townsend's ground squirrel, montane vole, and western harvest mouse were only found within the kipukas (or very close to the boundary). Theoretically, species that utilize the lava will have an increased potential for immigrating into a kipuka.

3. ***Kipuka size:*** For monitoring small mammal populations, the size of the kipuka must be given serious consideration. As mentioned above, some species use the lava while others do not. To take that one step further, some species may reside in the lava but forage in the kipuka. It is therefore reasonable to assume that the trapping success for a given species may depend on how close the traps are located to the kipuka edge. In setting up a population-monitoring program, it would be necessary to understand: (1) which species utilize the lava, (2) how the lava is used by individual species, and (3) how far into the kipuka animals that reside in the lava will travel in search of food.

4. ***Predation:*** Because of their size and isolation, kipukas may not be capable of maintaining populations of predators. This may result in predation pressures that are either greatly reduced or intermittent. If predation is limited within a kipuka, local prey populations may rapidly outstrip their resources, resulting in large fluctuations in populations. If predation is intermittent (e.g., if a predator species only periodically appears in the kipuka), short-term predation pressure may be severe, also resulting in large fluctuation in prey species. During predation lulls, small mammal populations in isolated kipukas may build up to densities that greatly exceed those found on less isolated kipukas where predators may forage more frequently (Lovejoy 1980), or on the "mainland." This is especially important in smaller kipukas. These fluctuations will likely result in significant but unpredictable effects on trapping success.

5. ***Grazing impacts:*** Kipukas, especially small ones, may have never been subject to domestic grazing. Furthermore, grazing by native wildlife is likely to be reduced in small, isolated kipukas. Areas with lower (or nonexistent) grazing pressures are likely to have very different plant community structures; therefore, different habitat qualities occur for small mammals.

6. ***Fire regimes:*** Kipukas are generally not subject to the large, intense wildfires that have been observed historically throughout the Snake River Plain. Differences in wildfire frequency and intensity will have dramatic impacts on plant community structure.

7. ***Restricted gene pool:*** Small mammal populations in isolated kipukas may have measurably different gene pools than populations of the same species in other kipukas or in the mainland. These differences will be related to immigration rates, and may result in increases or decreases in parameters such as body weight, tail length, etc. Insular mammalian populations living in areas of small size are often characterized by a drastic change in body mass compared to related continental populations (Michaux and DeBellocq 2002).

A-4. REFERENCES

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Appendix B

Gamma Field Test/Laboratory Results Comparison

Appendix B

Gamma Field Test/Laboratory Results Comparison

B-1. INTRODUCTION

This subsection provides a comparison of gamma-ray spectroscopy measurements of radioactivity in soil samples; specifically, an onsite field portable system and analyses by an offsite laboratory. The intent of this subsection is to establish the comparability of the field and laboratory data sets, so that, if the results are favorable, LTEM can make more extensive use of the INEEL field system. Using the techniques described in this subsection, satisfactory agreement is demonstrated between the field system and laboratory data sets. Statistically defensible reasons are given for why the data sets are favorably comparable. Additionally, recommendations are made for further comparison studies of field system with conventional laboratory measurements.

B-1.1 Sample Collection and Analytical Results

The field system is comprised of a portable gamma-ray spectrometer. Soil samples are collected, brought to the onsite detector system (either in a vehicle at the job site or in an onsite laboratory), quickly analyzed by gamma-ray spectroscopy, and then returned to the sample location. The field system allows for fast, accurate, and sensitive determination of gamma-ray emitting radionuclides in soil. This system's quick turnaround time and reduced cost make it attractive for environmental work because it allows for a larger number of sample analyses, thereby providing more extensive characterization of contaminated areas.

Fourteen soil samples were collected for gamma-ray spectroscopy analysis by both the field system and the offsite laboratory. Both groups were asked to report the concentrations and associated 1-sigma (σ) uncertainties for cesium-137 (Cs-137) and potassium-40 (K-40). The reported concentrations and 1σ uncertainties for both analytical methods are shown in Table B-1.

Table B-1. Field and laboratory reported Cs-137 and K-40 concentrations in soil.

Sample ID	Laboratory Cs-137 (pCi/g)	Field Cs-137 (pCi/g)	Laboratory K-40 (pCi/g)	Field K-40 (pCi/g)
ECX03401RH[a]	0.729 ± 0.047	0.4 ± 0.06	21.4 ± 1.0	18.2 ± 1.6
ECX04401RH	0.0708 ± 0.02	<0.174[b]	20.4 ± 0.96	17.0 ± 1.5
ECX03501RH[a]	0.866 ± 0.067	1.04 ± 0.04	22.1 ± 1.3	21.0 ± 0.9
ECX04501RH	0.107 ± 0.021	<0.062[b]	19.9 ± 0.98	20.7 ± 1.4
ECX03601RH[a]	2.21 ± 0.015	1.92 ± 0.05	21.2 ± 1.2	22.8 ± 2.6
ECX04601RH	0.163 ± 0.034	0.2 ± 0.02	21.8 ± 1.3	22.8 ± 1.0
ECX03701RH[a]	0.909 ± 0.070	1.28 ± 0.04	22.7 ± 1.4	23.7 ± 2.0
ECX04701RH	0.0973 ± 0.0232	0.1 ± 0.01	21.1 ± 1.0	21.0 ± 1.9
ECX03801RH[a]	1.18 ± 0.07	3.93 ± 0.07[c]	22.5 ± 1.2	24.1 ± 2.4
ECX04801RH	0.278 ± 0.031	0.412 ± 0.024	20.1 ± 1.2	22.0 ± 1.2
ECX03901RH[a]	0.83 ± 0.06	0.716 ± 0.033	22.7 ± 1.4	24.8 ± 1.1

Table B-1. (continued).

Sample ID	Laboratory Cs-137 (pCi/g)	Field Cs-137 (pCi/g)	Laboratory K-40 (pCi/g)	Field K-40 (pCi/g)
ECX04901RH	0.0303 ± 0.0163	<0.095[b]	21.7 ± 1.1	20.3 ± 2.1
ECX04001RH[a]	1.12 ± 0.08	1.24 ± 0.05	20.1 ± 1.2	21.1 ± 2.6
ECX05001RH	0.0894 ± 0.0254	<0.109[b]	20.0 ± 1.2	21.2 ± 1.8
Mean	0.62 ± 0.01	1.12 ± 0.01	21.3 ± 0.3	21.5 ± 0.5
Std. Deviation	0.63	1.14	1.03	2.15

a. These samples were surface samples collected at a depth interval of 0 to 2 in. All other samples were collected from subsurface soils from 2 to 24 in.
b. The "less-than" values were censored from the data comparison and statistical analyses.
c. The field Cs-137 concentration of 3.93 ± 0.07 pCi/g is identified as an outlier (GraphPad 2003).

As noted in Table B-1, four of the reported Cs-137 field results for the subsurface soil samples were given as "less than" a specific value, while the laboratory results for the associated subsamples were reported as specific values. This difference in reporting reflects a small difference in the detection limit attainable by the individual analytical methods. Factors that influence detection limits include detector size/efficiency, counting times, sample geometry, and system background. Additionally, the field sample volume was significantly smaller than the laboratory volume. The field system uses a puck geometry that holds approximately 75 g of soil. The laboratory uses a standard 250 ml jar that holds approximately 300 g.

B-1.2 Data Comparison

Three tests were performed to evaluate the field data against the laboratory data; specifically, the three tests were (1) one to one comparison between the laboratory and field data testing the distribution of the difference between the two results, in units of the combined uncertainty, against the standard normal distribution (Blackwood 2003); (2) test of relative bias between the two methods using parametric and nonparametric tests; and (3) test of the precision difference between the two methods using Pitman's test (Blackwood et al.1991).

B-1.2.1 One-to-One Comparison

A simple method of comparing the data sets has been used. For each field result, the basic question asked is, "Does the field result agree with the laboratory result within the bounds suggested by the 1-σ uncertainties of the two measurements?" If no systematic differences exist between the field and laboratory system measurement results, then the field and laboratory measurements should differ only due to random errors in measurements. Under the assumption that the random measurement errors are normal and independently distributed, a test comparing a pair of measurements can be performed by first calculating the following z-statistic:

$$z = \frac{x_{lab} - x_{field}}{\sqrt{\sigma_{lab}^2 + \sigma_{field}^2}}.$$

Looking up the calculated z value in a table of standard normal probability values gives a p-value for the test of the difference between the two measurements. For example, if the absolute value of z is greater than 1.96, then the null hypothesis of equivalent measurements can be rejected at the 0.05 significance level (i.e., with 95% confidence).

Results of this test applied to each of the data pairs are given in Table B-2.

Table B-2. Direct data comparison results.

Sample ID	z statistic, Cs-137	p-value	z statistic, K-40	p-value
ECX03401RH[a]	-4.31	0.00	-1.67	0.09
ECX04401RH		N/A	-1.89	0.06
ECX03501RH[a]	2.27	0.02	-0.69	0.49
ECX04501RH		N/A	0.48	0.63
ECX03601RH[a]	-1.91	0.06	0.56	0.58
ECX04601RH	0.94	0.35	0.61	0.54
ECX03701RH[a]	4.54	0.00	0.41	0.68
ECX04701RH	0.11	0.91	-0.05	0.96
ECX03801RH[a]	26.5	0.00	0.59	0.56
ECX04801RH	3.46	0.00	1.10	0.27
ECX03901RH[a]	-1.62	0.11	1.17	0.24
ECX04901RH		N/A	-0.6	0.55
ECX04001RH[a]	1.25	0.21	0.34	0.73
ECX05001RH		N/A	0.55	0.58

a. These samples were surface samples collected at a depth interval of 0—2 in. All other samples were collected from subsurface soils from 2 to 24 in.

Table B-2 shows that the agreement of the Cs-137 data pairs is mixed. There are five pairs that differ significantly at the 0.05 level. The K-40 comparison shows no significant differences at the 0.05 level.

The results for Cs-137 suggest that the field system may be biased relative to the laboratory system. However, an alternative explanation is that the reported 1-sigma errors are underestimated. That would lead to artificially high z values and false detection of significant differences. This issue is likely due to heterogeneity of the sample and will be addressed during the next field season, as discussed in Section 1.2.4.

B-1.2.2 Relative Bias

The previous section analyzed data on a sample-by-sample basis. In this section, measures of the average performance (i.e., means and medians) of the two systems are compared. These tests address the issue of whether or not there is any significant bias in the field system compared to the laboratory system. (If there is a significant difference between the means or medians of the two sets of measurements, then it is an indication that the field system is biased relative to the laboratory system.)

Four tests were performed to test for relative bias in the field system. Paired t-tests were performed on the raw data and on log transformed data. Two nonparametric tests, the sign test and the Wilcoxon signed ranks test, were also performed. In all cases, only the data where both the laboratory and filed result were above detection levels were used. Analysis of the Cs-137 data was performed with and without the outlier data pair.

As indicated in the next section, at least the Cs-137 data tend to be more lognormally distributed than normally distributed. This suggests that parametric tests that assume normality such as the paired

t-test should be performed on log transformed data. However, depending on the degree of skewness in the data and the number of samples analyzed, the t-test on untransformed data may also be appropriate. Thus, t-tests on both the transformed and untransformed data were performed so that results could be compared. Note that while the t-test on the transformed data is a test of means of the logarithms of the data, it is equivalent to a test of medians on the original data (i.e., under lognormality, the means of the distribution of the logs of the data transform back to the median of the data distribution on the original scale.)

The nonparametric sign test is a very general test of the difference between two data distributions. If the two distributions are the same, then the field test result will be expected to exceed the laboratory test result 1/2 the time and to be smaller 1/2 the time. The sign test is a test of this condition. The null hypothesis is that P(+) = P(-), where P(+) and P(-) are the probabilities, that the field test result are greater and less than the corresponding lab test result. If additional assumptions are made about the data, the test results are also interpretable as tests for equality of means and/or medians (Conover 1999).

The Wilcoxon signed ranks test is a similar test to the sign test. It is a test of the equality of means and medians of two distributions under the assumption that the distribution of the differences in the paired measurements is symmetrical.

Rather than choosing a single test for the analysis of relative bias in the field vs. laboratory measurements, all four tests were performed. The data only approximate the required assumptions for the described tests and the various tests are more or less robust to violations of the required assumptions. Hence performing all four tests provides greater assurance against drawing an erroneous conclusion due to violation of test assumptions. Tests were also performed with and without the outlier Cs-137 data point. The means and medians that the tests relate to are given in Table B-3. Test results are given in Table B-4.

Table B-3. Means and medians of data used in the statistics tests for relative bias. (Data pairs from Table B-1 with nondetected quantities excluded.)

Test Variable	N (pairs)	Mean		Median	
		Lab	Field	Lab	Field
Cs-137	10	0.838	1.12	0.846	0.878
Cs-137 logarithms	10	-0.510	-0.353	-0.168	-0.147
Cs-137 (outlier excluded)	9	0.800	0.812	0.825	0.716
Cs-137 logarithms (outlier excluded)	9	-0.585	-0.544	-0.192	-0.334
K-40	14	21.3	21.5	21.3	21.2
K-40 logarithms	14	3.06	3.06	3.06	3.05

Table B-4. Results of statistics tests for relative bias.

Test Variable	N (pairs)	p-value for Statistical Test		
		Paired t-test	Sign test	Wilcoxon Signed Rank Test
Cs-137	10	0.34	0.83	0.33
Cs-137 logarithms	10	0.31	NA[a]	NA

Table B-4. (continued).

Test Variable	N (pairs)	p-value for Statistical Test		
		Paired t-test	Sign test	Wilcoxon Signed Rank Test
Cs-137 (outlier excluded)	9	0.87	0.50	0.59
Cs-137 logarithms (outlier excluded)	10	0.70	NA	NA
K-40	14	0.66	0.42	0.51
K-40 logarithms	14	0.80	NA	NA
a. The nonparametric tests were not performed on the log transformed data because the results would be the same as for the untransformed data.				

In the statistics tests for relative bias, a small p-value (e.g., $p<0.05$) would be an indication of differences in the mean or median of the data distributions and hence the existence of bias. In Table B-4, none of the p-values are small, hence the conclusion is that there is no statistically significant relative bias indicated by these data.

B-1.2.3 Precision Difference

As a test for precision differences between the two methods, the Pitman test for equality of two variances was applied. The Pitman test for equality of correlated variances assumes normal distributions for the data. The Cs-137 data failed the Shapiro-Wilk test for normality but the logarithms of the data passed. The K-40 showed nearly the same results on the Shapiro-Wilk test whether or not the log transformation was applied. For consistency, the Pitman test was performed on the log transformed data for both Cs-137 and K-40.

Only the 10 Cs-137 data pairs where both the lab and puck measurements were above detection limits were used in the analysis. The Cs-137 analysis was also performed after eliminating the one outlier data point. Although the Pitman test was applied to the log transformed data, for reference purposes, the variances of the data before the log transformation was applied are given in Table B-5.

Table B-5. Pitman test summary.

	Number of Data Pairs	Variance of GEL Data	Field Data Variance	p-value
Cs-137	10	0.38	1.29	
ln(Cs-137)	10	0.95	1.20	0.47
Cs-137	9	0.41	0.36	
ln(Cs-137)	9	1.01	0.94	0.75
K-40	14	1.06	4.62	
ln(K-40)	14	0.0024	0.0107	0.006

With a p-value of 0.002, the null hypothesis of equal variance (i.e., precision) is strongly rejected for the K-40 measurements. For the Cs-137 data, there was no statistically significant difference found between the variances (either with or without the outlier data point included); as such, the precision of the field instrument is equivalent to that of the laboratory measurements.

B-1.2.4 Recommendations for Further Testing

The soil samples sent for field analysis and to laboratory were separate subportions (splits) of a well mixed, but potentially inhomogeneous source. Additionally, although differences in procedures, equipment, and data validation exist between the two methods, quantitative radioactivity measurements both by the field system and the laboratory are based on accepted practices including (but not limited to) direct reference to traceable standards of known activity, written procedures, regular instrument calibration, and quality control programs. The respective quantitative measurement techniques used by the field system and the laboratory are designed to accurately determine within a quoted uncertainty the concentration of the radionuclide(s) being measured. The comparison study between field and laboratory gamma spectroscopy data for the soil samples collected in 2003 shows that the two methods are similar, and quality data can be obtained from the field system; however, a larger data set is required to reach a definitive conclusion on the use of the field system in place of laboratory analysis.

Additional soil sampling in support of ecological risk monitoring is planned for the summer of 2004. A minimum of 60 samples will be collected and analyzed using both the field system and off-Site laboratory. In addition to the overall data quality objectives identified in the 2004 field sampling plan, the goals of the 2004 field sample analysis will be to decrease the system lower limit of detection for Cs-137 to 0.1 pCi/g at the 95% confidence level, and decrease the average counting uncertainty to 5% or less. The goal of the sampling will be to provide a large data set for an accurate statistical comparison between the field and laboratory generated data. These goals were selected to meet the overall objective of the comparison study of demonstrating the comparability between the field and laboratory data, thus providing justification for increased use of field instrumentation over laboratory analyses.

Included in the sample collection, duplicate samples will be collected and analyzed on the field system and by the laboratory at a frequency of no less than 1 duplicate per 10 samples. This will aid in identifying additional sources of variability due to the potential heterogeneity of the samples.

The sample analysis and subsequent data analysis that will be performed during the 2004 will be designed to provide further confirmation that laboratory and field gamma spectroscopy are comparable/interchangeable methods. The sample and data analysis design will include:

- Minimum of 1-hr count times
- Minimum average sample size of 150 g
- Use larger, more efficient detector.

Based on previous experience and testing with the field system, count times of 1-hr are sufficient to obtain detection limits of approximately 0.1 pCi/g. Achieving this lower limit of detection and minimizing the counting uncertainty will also be aided by doubling the sample size, which for a given sample, contains twice the radioactivity (assuming a homogeneous sample). The larger detector identified for use during the 2004 field season is approximately 35% more efficient than the detector used during the 2003 sampling event. These sample analysis design changes will contribute to increased accuracy of the system in measuring a given sample concentration by decreasing the measurement counting uncertainty.

The large number of samples that will be collected in 2004 (>60 samples) will allow for a more rigorous and accurate statistical comparison of the two measurement systems. Cesium-137 and K-40 data will continue to serve as the benchmarks for the comparison study as they are ubiquitous in surface soils.

B-2. REFERENCE

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Appendix C

Sage Grouse and the Idaho National Engineering and Environmental Laboratory

ACRONYMS

BLM	Bureau of Land Management
ESA	Endangered Species Act
INEEL	Idaho National Engineering and Environmental Laboratory
NOI	Notice of Intent
PACWPL	Policy Analysis Center for Western Public Lands
T&E	threatened and endangered
USFWS	U.S. Fish and Wildlife Service

Appendix C

Sage Grouse and the Idaho National Engineering and Environmental Laboratory

C-1. INTRODUCTION

The purpose of this report is to provide background information on the status of sage grouse in the western United States and to describe how the listing of this species as a "Threatened and Endangered" (T&E) species under the Endangered Species Act (ESA) could impact operations at the Idaho National Engineering and Environmental Laboratory (INEEL). Included in the report is (1) a description of the species and its habitat requirements, (2) a summary of potential or perceived threats to sage grouse in Idaho and elsewhere, (3) a description of the current legal status of sage grouse along with a summary of recent petitions to list sage grouse as a T&E species, (4) a general description of how the listing of sage grouse as a T&E species could impact operations at the INEEL, and (5) a summary of the information regarding sage grouse that would be needed by the INEEL (or other land managers) should the species become listed—or conversely, information INEEL should have on hand to avoid listing.

The Policy Analysis Center for Western Public Lands (PACWPL) recently issued a document titled *Conservation of Greater Sage Grouse on Public Lands in the Western U.S.: Implications of Recovery and Management Policies* (PACWPL 2002). In addition to providing considerable background information on sage grouse, the Center's general objective is "to identify a set of short-run (three to five years) policy alternatives that are based on a synthesis of empirical research into the needs of the Greater sage grouse (*Centrocercus urophasianus*) and its relationship to the sagebrush system" (PACWPL 2002). Much of the information provided here is taken from the PACWPL document, which is available on the internet (http://sagemap.wr.usgs.gov/Docs/sage-grouse_policy.pdf).

C-2. SAGE GROUSE

The Species: Sage grouse are members of the *Phasianidae*, which include partridges, grouse, and related allied species. Traditionally, all sage grouse were considered to be members of the same species referred to as the Greater (or Northern) sage grouse (*Centrocercus urophasianus).* However, the American Ornithologists' Union now recognizes the existence of a second species, the Gunnison sage grouse (*C. minimus*), based on differences in size, genetic structure, courtship behavior, and plumage in comparison with *C. urophasianus*. Gunnison sage grouse are not found in Idaho, having a range that is limited to western Colorado and eastern Utah. In the past, some organizations have promoted the concept that some geographically isolated populations of sage grouse represent independent species or subspecies. The consensus of ornithologists, however, is that only the Gunnison sage grouse represents an independent species or subspecies of sage grouse; the rest are considered to be isolated populations of the Greater sage grouse. For the purpose of this report, only the Greater sage grouse is considered, and all sage grouse found in eastern Idaho are assumed to be this species.

The Greater sage grouse is the largest grouse native to North America. Males weigh as much as eight pounds, while females are somewhat smaller. The species are brown, black, and white and possess narrow, pointed tail feathers. Males are distinguished by large yellow throat sacs surrounded by a collar of bright white feathers. The males inflate these sacs with air during mating displays. Females are a mottled brown color, which provides excellent camouflage in their native habitat.

Sage grouse reproduce slowly, often not breeding until they are two years old, and seldom renesting the same year if they lose eggs or chicks to predators or bad weather (http://www.nwf.org/wildlife/sagegrouse/behavior.cfm). Sage grouse gather to breed at "leks," traditional open locations where males display to females during competitive springtime mating rituals. Following mating, females nest and raise up to a dozen chicks. Sage grouse chicks leave their nest shortly after hatching and are able to fly in one week. Some populations of sage grouse are migratory, flying and walking 100 miles or more between breeding and wintering grounds (http://www.nwf.org/wildlife/sagegrouse/behavior.cfm).

Historical Sage Grouse Range: The historical distribution of sage grouse closely approximates that of sagebrush (*Artemisia spp.*). Originally, Greater sage grouse were found in 16 states and three provinces (Aldrich 1963; Johnsgard 1973). However, the species' current home range has been dramatically reduced and now includes parts of only eleven western states (Idaho, Montana, North Dakota, South Dakota, Wyoming, Colorado, Utah, California, Nevada, Oregon, and Washington) and one Canadian province (Saskatchewan) (Braun 1998; Connelly and Braun 1997). Sage grouse are no longer found in several states (Arizona, Kansas, Nebraska, New Mexico, and Oklahoma) where viable populations were once known.

Habitat and Resource Needs: Sage grouse are generally considered obligates of the sagebrush-steppe system, requiring sagebrush for nesting, winter feeding, and shelter from weather and predators throughout the year. According to the National Wildlife Foundation web site (http://www.nwf.org/wildlife/sagegrouse/behavior.cfm), the best sage grouse habitats are mature sagebrush stands, often 30 to 100 years old, containing a dense understory of native perennial grasses such as blue bunch wheatgrass and native forbs. Sage grouse are omnivorous, eating both vegetation and insects. Chicks eat primarily insects and forbs while adults eat sagebrush during the winter and forbs during other seasons. Unlike many birds, sage grouse cannot digest seeds, so they do not utilize wheat, corn, or other agricultural grains. However, they will consume alfalfa, dandelion, and other introduced forbs. A study in Idaho indicated that a group of 400 sage grouse requires as much as 800 square miles of good habitat, or roughly the area of the INEEL, to survive and maintain their population. Due to their nearly total dependence on sagebrush habitats, sage grouse may serve as an indicator species for the overall condition of the sagebrush ecosystem, with a decline in grouse populations likely indicative of declining sagebrush-steppe ecosystems (Connelly et al. 2000; Patterson 1952; Schroeder et al. 1999).

C-3. THREATS TO SAGE GROUSE

Although direct effects on sage grouse by factors such as disease, pesticide toxicity, and predation may take their toll on sage grouse populations, the most important threats to sage grouse throughout their range are those factors that contribute to the deterioration or loss of pristine sagebrush-steppe habitat. These factors include direct and intentional destruction of habitat for human purposes (e.g., agriculture, urbanization). More important, however, are a group of factors that interact to degrade or destroy large areas of sagebrush habitat. These include grazing, fire, and the invasion by exotic plant species.

In eastern Idaho (and throughout the sagebrush-steppe biome), large areas are invaded each year by exotic plant species that compete with the native plant communities upon which sage grouse depend. In Idaho, the most significant exotic species is cheatgrass (*Bromus tectorum*), which not only out-competes native vegetation, but also contributes to the increase in the frequency and intensity of wildfires in the area. Cheatgrass is an exotic winter annual grass species, which has become established over large portions of the western United States since its introduction in the 1890s. Cheatgrass germinates in the fall and grows rapidly early in the growing season, thereby restricting the availability of nitrogen and other resources for native plant species. These characteristics allow cheatgrass to dominate sites disturbed by fire or other processes. Furthermore, since the species is usually dried out and dead in mid-July, it adds to

the fire cycle by providing substantial available fuel across huge geographic areas during the height of the western fire season. Cheatgrass is therefore well adapted to invade and become the dominant species in lands disturbed by fire, grazing, or other mechanisms. Sagebrush recovers slowly from fire, often requiring from 40 to over 100 years to provide adequate habitat for supporting sage grouse following a fire (Houston 1973; Whisenant 1990; Wright and Bailey 1982). Grazing history is often linked to the spread of invasive species such as cheatgrass, and therefore is also linked to increased fire frequencies.

The spread of exotic weeds has been estimated to occur at the rate of 4,600 acres per day on public lands in the United States (U.S. Department of the Interior Bureau of Land Management 1996). The Bureau of Land Management (BLM) recently estimated that 220 million acres of traditional pristine sagebrush have now been reduced to approximately 150 million acres, much of which is severely degraded by grazing and other factors. Undisturbed sagebrush-steppe lands are increasingly rare. However, the protected status of the INEEL Site has provided a refuge of sorts for this plant community, largely because of the elimination of grazing. In fact, the INEEL represents probably the largest refuge for sagebrush communities within the United States.

Not surprisingly, sage grouse populations generally reflect the loss of sagebrush habitat, with substantial populations only being reported for areas where considerable "high quality" sagebrush is present, notably in parts of Oregon, Montana, and Wyoming. Over the entire range, the total sage grouse population was recently estimated at around 140,000 individuals in eleven western U.S. states (http://www.nwf.org/wildlife/sagegrouse/). This compares with estimations of as many as two million sage grouse in existence in the early 1800s. Large flocks of the species were still reported a century after the species was first observed and described by the Lewis and Clark expedition in 1806. The loss of habitat has been directly correlated with the reported decline in sage grouse populations.

Throughout the western United States, sagebrush-steppe habitats have become much more widely fragmented than they were in the past. There is evidence that both breeding populations and reproductive rates of sage grouse have declined over the long term (Connelly and Braun 1997). Estimated losses in breeding populations range from 17% in Wyoming to 47% in Washington, with a range-wide average of 33% (Connelly and Braun 1997). Similarly, sage grouse production (number of juveniles per female in the fall) has declined an average of 25% over the bird's entire range (Connelly and Braun 1997). Braun (1998) concluded that the overall distribution of sage grouse has declined by 50% since European settlement, while the apparent breeding population has decreased by 45 to 80% since the early 1950s.

C-4. LEGAL STATUS OF SAGE GROUSE

Current legal status: The Greater (or Northern) sage grouse does not currently have status as a threatened or endangered species despite significant population and habitat reductions. However, several states and areas have recently petitioned the federal government to list the species. A summary of recent petitions for listing sage grouse is provided in Table C-1. Additionally, the threat of listing has had positive results in terms of efforts for conserving remaining sage grouse habitat. For example, one of the goals of the BLM's Great Basin Restoration Initiative is to conserve sage grouse habitat by restoring large areas burned by wildfires or invaded by noxious weeds. Sage grouse are now being considered in local grazing management plans and proposals to protect public lands.

Table C-1. Summary of Sage Grouse Petitions submitted to the U.S. Fish and Wildlife Service (USFWS)[1] as of May 27, 2004.

Petition Date: May 14, 1999 (74 pages)	**Petition Date:** January 25, 2000 (254 pages)	**Petition Date:** December 28, 2001 (493 pages)
Species: Washington population of the Western Sage Grouse *Centrocercus urophasianus phaios*	**Species:** Gunnison Sage Grouse *Centrocercus minimus*	**Species:** Mono Basin population of the Greater Sage Grouse *Centrocercus urophasianus phaios*
Petition Request: List as threatened or endangered	**Petition Request:** List as endangered or threatened, emergency listing, and designation of critical habitat	**Petition Request:** Emergency list as endangered
Petitioners: Northwest Ecosystem Alliance and Biodiversity Legal Foundation	**Petitioners:** Mark Salvo, American Lands Alliance, Dr. Randy Webb, Net Work Associates, Andy Kerr, The Larch Company, Jasper Carlton, Biodiversity Legal Foundation, Susan Ash, Wild Utah Forest Campaign, Rob Edwards, Sinapu	**Petitioners:** Donald Randy Webb, Institute for Wildlife Protection
USFWS Determination: Both a 90-day finding (August 24, 2000) and a 12-month finding (May 7, 2001) published in the Federal Register. Outcome was that the petition presents substantial information and listing is warranted but precluded for the Columbia Basin Distinct Population Segment (occurs in WA and northern OR); became a candidate by default under USFWS policy.	**USFWS Determination:** The species was designated as a candidate by USFWS prior to receipt of the petition. The Listing priority number was elevated in a May 4, 2004 Federal Register Notice of Review to a 2. However the Service does not believe that emergency listing is warranted at this time.	**USFWS Determination:** Initial review indicated that the situation does not warrant an emergency listing. A 90-day finding was initiated August 1, 2002. The 90-day finding was published in the Federal Register December 26, 2002 with an outcome that the information presented in the petition is not substantial.
Legal Action: No Notice Of Intent (NOI**) to date	**Legal Action:** Court complaint dated September 29, 2000 from the American Lands Alliance et al. In summer 2003 the Court rules in the USFWS's favor. The ruling is that USFWS candidate process and the determination by USFWS that a species should be on the candidate list is equivalent to a 12-month finding. On March 16, 2004 the plaintiffs file a lawsuit in Washington D.C. District Court asking that Court to order the USFWS to emergency list the species as endangered.	**Legal Action:** A court complaint dated July 3, 2002 was received from the Institute for Wildlife Protection. On December 1, 2003 U.S. District Court judge issued an order in favor of the USFWS and dismissing the plaintiff's case. Plaintiffs have filed a notice that they intend to appeal the Courts decision. Another NOI, dated January 9, 2003, was filed by the plaintiffs regarding the merits of the USFWS's 90-day finding itself.
Lead USFWS Office: Upper Columbia Fish and Wildlife Office, Spokane, Washington (509) 891-6839	**Lead USFWS Office:** Western Colorado Field Office, Grand Junction, Colorado (970) 243-2778	**Lead USFWS Office:** Nevada Fish and Wildlife Office, Reno, Nevada (775) 861-6325
USFWS Contact: Chris Warren	**USFWS Contact:** Terry Ireland	**USFWS Contact:** Kevin Kritz

Table C-1. (continued).

Petition Date: January 24, 2002 (468 pages)	**Petition Date:** June 18, 2002 (7 pages)	**Petition Date:** July 3, 2002 (524 pages)
Species: Western subspecies of the Greater Sage Grouse *Centrocercus urophasianus phaios*	**Species:** Greater Sage Grouse *Centrocercus urophasianus*	**Species:** Eastern subspecies of the Greater Sage Grouse *Centrocercus urophasianus urophasianus*
Petition Request: List the subspecies	**Petition Request:** List as endangered	**Petition Request:** List as endangered
Petitioners: Donald Randy Webb, Institute for Wildlife Protection	**Petitioners:** Craig Dremann	**Petitioners:** Donald Randy Webb, Institute for Wildlife Protection
USFWS Determination: A 90-day finding was initiated October 30, 2002. The 90-day finding was published in the Federal Register on February 7, 2003 with an outcome that the information presented in the petition is not substantial.	**USFWS Determination:** 90-day finding initiated December, 2003. USFWS published the 90-day finding in Federal Register on April 21, 2004. Outcome was a positive 90-day finding; information presented, and in USFWS files, was substantial. USFWS initiates a status review. Public input on status or threats to species should be submitted by June 21, 2004.	**USFWS Determination:** 90-day finding initiated on October 3, 2003 as per court order. The 90-day finding was published in the Federal Register on January 7, 2004 with an outcome that the information presented in the petition is not substantial.
Legal Action: NOI dated February 7, 2003 from the Institute for Wildlife Protection regarding the 90-day finding. Court complaint dated June 6, 2003 from the Institute for Wildlife Protection challenging the merits of the 90-day finding. Both parties waiting on outcome of the Courts decision on this case.	**Legal Action:** No legal action to date	**Legal Action:** Court complaint dated January 10, 2003 filed in the Western District Court of Washington by the Institute for Wildlife Protection for failure to do a 90-day finding. On October 3, 2003 the District Court judge ordered the USFWS to make a 90-day finding which is due by January 3, 2004.
Lead USFWS Office: Oregon Fish and Wildlife Office, Portland, Oregon (503) 231-6179	**Lead USFWS Office:** Wyoming Ecological Services Field Office, Cheyenne, Wyoming (307) 772-2374	**Lead USFWS Office:** Wyoming Ecological Services Field Office, Cheyenne, Wyoming (307) 772-2374
USFWS Contact: Jeff Dillon	**USFWS Contact:** Pat Deibert	**USFWS Contact:** Pat Deibert

Table C-1. (continued).

Petition Date: March 19, 2003 (992 pages; combination of previous petitions for Western and Eastern subspecies)	**Petition Date:** December 22, 2003 (218 pages)
Species: Greater Sage Grouse *Centrocercus urophasianus*	**Species:** Greater Sage Grouse *Centrocercus urophasianus*
Petition Request: List as endangered	**Petition Request:** List as threatened or endangered
Petitioners: Donald Randy Webb, Institute for Wildlife Protection	**Petitioners:** Mark Salvo American Lands Alliance, Biodiversity Conservation Alliance, Center for Biological Diversity, Forest Guardians, The Fund for Animals, Gallatin Wildlife Association, Great Old Broads for Wilderness, Hells Canyon Preservation Council, The Larch Company, Northwest Ecosystem Alliance, Northwest Council for Alternatives to Pesticides, Oregon Natural Desert Association, Oregon Natural Resources Council, Predator Defense Institute, Sierra Club, Sinapu, Western Fire Ecology Center, Western Watersheds Project, Wild Utah Project, Wildlands CPR, and Center for Native Ecosystems
USFWS Determination: 90-day finding initiated December, 2003. USFWS published the 90-day finding in Federal Register on April 21, 2004. Outcome was a positive 90-day finding; the information presented, and in USFWS files, was substantial. USFWS initiates a status review. Public input on status or threats to species should be submitted by June 21, 2004	**USFWS Determination:** 90-day finding initiated December, 2003. USFWS published the 90-day finding in Federal Register on April 21, 2004. Outcome was a positive 90-day finding; the information presented, and in USFWS files, was substantial. USFWS initiates a status review. Public input on status or threats to species should be submitted by June 21, 2004
Legal Action: No legal action to date	**Legal Action:** No legal action to date
Lead USFWS Office: Wyoming Ecological Services Field Office, Cheyenne, Wyoming (307) 772-2374	**Lead USFWS Office:** Wyoming Ecological Services Field Office, Cheyenne, Wyoming (307) 772-2374
USFWS Contact: Pat Deibert	**USFWS Contact:** Pat Deibert

[1] Table compiled by Kevin Kritz, U.S. Fish and Wildlife Service, Nevada Fish and Wildlife Office, 1340 Financial Blvd. Suite #234 , Reno, NV 89502-7147 (775) 861-6300

**** 60-day Notice of Intent to Sue (NOI)**

C-5. POTENTIAL IMPACTS TO THE INEEL SITE FROM LISTING

To quote the Policy Analysis Center for Western Public Lands:

> "Listing of sage-grouse would have far-reaching consequences on how federal agencies manage sagebrush ecosystems. It would require an emphasis on sagebrush ecosystem conservation where the removal of sagebrush would be an act of 'last resort.' " (PACWPL, 2002)

Clearly, an ESA listing of sage grouse (or any other species) as a T&E species would severely limit the options available to INEEL Site management in terms of any new actions. Any new construction or other significant activity would require that INEEL management show that sage grouse would not be adversely impacted by the activity. Listing of sage grouse would necessitate completion or updating of inventories at multiple scales over entire annual ranges of affected populations. Decisions regarding land use management and restoration would also be dependent upon completion of these inventories. However, our current level of knowledge on sage grouse and sage grouse habitat at the INEEL Site is inadequate to make these determinations. In the absence of credible information that shows sage grouse will not be adversely impacted, any proposed action will effectively be stopped until that information is generated. In a recent modeling exercise conducted by the INEEL in collaboration with the Stoller Corporation, it was estimated that ***delays of from two to five years*** could be anticipated for any new project if the necessary data are not readily available (J. Jacobson, personal communication, 2004). These delays could be shortened dramatically if the INEEL were proactive in generating the necessary data and working with federal regulators before an ESA listing occurs. Because regulatory agencies will treat uncertainty conservatively, reliable data for the INEEL and surrounding areas may ultimately help ***prevent*** a listing by demonstrating that populations are being closely monitored, and appropriate and effective management programs are in place (PACWPL 2002).

C-6. INFORMATION NEEDS

As indicated above, the listing of sage grouse as a T&E species under ESA will effectively halt virtually any significant activity at the INEEL Site until a full assessment of the impact of the activity on sage grouse is performed. The data necessary to adequately assess impacts to sage grouse are largely unavailable for the INEEL Site and surrounding areas, further exacerbating the situation. These assessments would require detailed information of many types, including:

1. **Sage grouse populations:** Reliable sage grouse population estimates will be required for the INEEL Site and surrounding areas before potential impacts can be assessed. In many areas, including the INEEL Site, these data are almost totally lacking. In addition, data on many aspects of sage grouse ecology are limited and/or of questionable scientific certainty (Connelly et al. 2000; Schroeder et al.1999).

2. **Habitat:** Although there are some data available on vegetation communities at the INEEL Site, these data are largely out of date. An inventory of distribution, quality, and abundance of all sagebrush habitats is needed and is currently being developed (SAGEMAP 2001). Apart from other applications of the ESA, it is certain that any existing large stands of high-quality sagebrush used by sage grouse will likely receive the highest priority for protection and retention by regulatory agencies. This is an important consideration with the INEEL because the protected status has in effect conserved large areas of sagebrush-steppe communities in their relatively pristine state. So, whereas much sagebrush rangeland has been permanently lost or altered (Braun et al. 1976; Braun 1998; Vale 1974), the INEEL Site represents one of the largest relatively undisturbed sagebrush areas, giving the area a higher priority for conservation.

3. **Invasive Plants:** Related to the need for assessing the quality and quantity of sagebrush habitat is the need for quantifying the extent of invasion by exotic plants such as cheatgrass and the rates at which these exotic species are invading. Reliance on plant community data that are even just a few years old without considering the rates at which cheatgrass and other invasive species are invading will be a bad thing. Consequently, it is essential that both landscape and local inventories made across lands of all ownerships be kept current to facilitate intelligent decision-making and permit monitoring over time.

4. ***Fire:*** Similarly, the large fires that have impacted the INEEL Site over the past decade have undoubtedly altered the plant community structure at the Site, and these changes must be quantified. Any changes in the fire regime (frequency and intensity) must be quantified, and additional efforts toward fire suppression may be required to conserve high-value sagebrush habitat.

5. ***Predation, drought, and other factors:*** The role played by predation and drought in the rapid decline of sage grouse since the late 1970s is the basis of many concerns expressed by numerous groups. Both of these issues, as well as others, are capable of impacting sage grouse, but how those effects come into play are complex and not easily understood. A reasonable understanding of these additional factors should ideally be separated from the impacts of a proposed action.

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Appendix D

Limitations and Validation Reports

Appendix D

Limitations and Validation Reports

D. N. Thompson letter to T. J. Haney, October 27, 2003, Transmittal of the Limitations and Validation (L&V) Report Pertaining to the Radiological, Organic, and Inorganic Analyses of Samples Collected for the Long-Term Ecological Monitoring FY-03, Sample Delivery Group (SDG) #ECT03101LA, (DNT-239-03)

D. N. Thompson letter to T. J. Haney, October 27, 2003, Transmittal of the Limitations and Validation (L&V) Report Pertaining to the Radiological, Organic, and Inorganic Analyses of Samples Collected for the Long-Term Ecological Monitoring FY-03, SDG #ECT04101LA, (DNT-240-03)

D. N. Thompson letter to T. J. Haney, October 27, 2003, Transmittal of the Limitations and Validation (L&V) Report Pertaining to the Radiological, Organic, and Inorganic Analyses of Samples Collected for the Long-Term Ecological Monitoring FY-03, SDG #ECX01901LA, (DNT-242-03)

D. N. Thompson letter to T. J. Haney, October 27, 2003, Transmittal of the Limitations and Validation (L&V) Report Pertaining to the Radiological, Organic, and Inorganic Analyses of Samples Collected for the Long-Term Ecological Monitoring FY-03, SDG #ECX03901LA, (DNT-243-03)

D. N. Thompson letter to T. J. Haney, October 27, 2003, Transmittal of the Limitations and Validation (L&V) Report Pertaining to the Radiological, Organic, and Inorganic Analyses of Samples Collected for the Long-Term Ecological Monitoring FY-03, SDG #ECX04901LA, (DNT-244-03)

D. N. Thompson letter to T. J. Haney, October 27, 2003, Transmittal of the Limitations and Validation (L&V) Report Pertaining to the Radiological, Organic, and Inorganic Analyses of Samples Collected for the Long-Term Ecological Monitoring FY-03, SDG #ECT02901LA, (DNT-245-03)

D. N. Thompson letter to T. J. Haney, October 27, 2003, Transmittal of the Limitations and Validation (L&V) Report Pertaining to the Radiological, Organic, and Inorganic Analyses of Samples Collected for the Long-Term Ecological Monitoring FY-03, SDG #ECT01101LA, (DNT-246-03)

Darwin M. Grigg letter to Thomas J. Haney, October 29, 2003, Transmittal of Nitroaromatics and Nitroamines Limitations and Validation (L&V) Report for Long-Term Ecological Monitoring FY-03, SDG # ECX04101N7 (DMG-119-03)

Darwin M. Grigg letter to Thomas J. Haney, October 29, 2003, Transmittal of Nitroaromatics and Nitroamines Limitations and Validation (L&V) Report for Long-Term Ecological Monitoring FY-03, SDG # ECX02101N7 (DMG-120-03)

Darwin M. Grigg letter to Thomas J. Haney, October 29, 2003, Transmittal of Nitroaromatics and Nitroamines Limitations and Validation (L&V) Report for Long-Term Ecological Monitoring FY-03, SDG # ECX01101N7 (DMG-121-03)

Darwin M. Grigg letter to Thomas J. Haney, October 29, 2003, Transmittal of Nitroaromatics and Nitroamines Limitations and Validation (L&V) Report for Long-Term Ecological Monitoring FY-03, SDG # ECX04801N7 (DMG-122-03)

Darwin M. Grigg letter to T. J. Haney, December 9, 2003, Transmittal of the Nitroaromatics Limitations and Validation (L&V) Report for Long-Term Ecological Monitoring FY-03, SDG # ECX001011G (DMG-152-03).

D. N. Thompson letter to T. J. Haney, November 5, 2003, Transmittal of the Limitations and Validation (L&V) Report Pertaining to the Radiological, Organic, and Inorganic Analyses of Samples Collected for the Long-Term Ecological Monitoring FY-03, SDG # ECX02101LA, (metals) (DNT-255-03)

D. N. Thompson letter to T. J. Haney, November 5, 2003, Transmittal of the Limitations and Validation (L&V) Report Pertaining to the Radiological, Organic, and Inorganic Analyses of Samples Collected for the Long-Term Ecological Monitoring FY-03, SDG # ECT031013A, (moisture content, pH, CEC) (DNT-256-03)

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S. Shinn letter to T. J. Haney, November 5, 2003, Transmittal of the Limitations and Validation (L&V) Report for the Radiological Analyses Pertaining to the Long-Term Ecological Monitoring FY-03 Project, SDG # ECT01901RH, (SOS-TL225-03)

S. Shinn letter to T. J. Haney, November 7, 2003, Transmittal of the Limitations and Validation (L&V) Report for the Radiological Analyses Pertaining to the Long-Term Ecological Monitoring FY-03 Project, SDG # ECX03901RH, (SOS-TL232-03)

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S. Shinn letter to T. J. Haney, November 10, 2003, Transmittal of the Limitations and Validation (L&V) Report for the Radiological Analyses Pertaining to the Long-Term Ecological Monitoring FY-03 Project, SDG # ECT04101RH, (SOS-TL234-03)

S. Shinn letter to T. J. Haney, November 11, 2003, Transmittal of the Limitations and Validation (L&V) Report for the Radiological Analyses Pertaining to the Long-Term Ecological Monitoring FY-03 Project, SDG # ECX02901RH, (SOS-TL238-03)

S. Shinn letter to T. J. Haney, November 11, 2003, Transmittal of the Limitations and Validation (L&V) Report for the Radiological Analyses Pertaining to the Long-Term Ecological Monitoring FY-03 Project, SDG # ECX04901RH, (SOS-TL239-03)

S. Shinn letter to T. J. Haney, December 18, 2003, Transmittal of Limitations and Validation Report for the Radiological Analyses in Support of the Long-Term Ecological Monitoring FY-03 Program, SDG # ECX001011G (SOS-35-03).

Appendix E

Analytical Contaminant Data

Appendix E

Analytical Contaminant Data

COMPOUND_NAME	Area	Type_location	Data	Total
2,4,6-Trinitrotoluene	ORD 1	DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.500
			Minimum CONCENTRATION	0.500
			Maximum CONCENTRATION	0.500
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	1000.182
			Minimum CONCENTRATION	501.000
			Maximum CONCENTRATION	2000.000
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.500
			Minimum CONCENTRATION	0.500
			Maximum CONCENTRATION	0.500
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	2.000
			Average CONCENTRATION	1.224
			Minimum CONCENTRATION	0.360
			Maximum CONCENTRATION	8.600

COMPOUND_NAME	Area	Type_location	Data	Total
2,4-Dinitrotoluene	ORD 1	DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.500
			Minimum CONCENTRATION	0.500
			Maximum CONCENTRATION	0.500
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	1000.182
			Minimum CONCENTRATION	501.000
			Maximum CONCENTRATION	2000.000
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.500
			Minimum CONCENTRATION	0.500
			Maximum CONCENTRATION	0.500
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.500
			Minimum CONCENTRATION	0.500
			Maximum CONCENTRATION	0.500
2,6-Dinitrotoluene	ORD 1	DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.500
			Minimum CONCENTRATION	0.500
			Maximum CONCENTRATION	0.500

COMPOUND_NAME	Area	Type_location	Data	Total
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	1000.182
			Minimum CONCENTRATION	501.000
			Maximum CONCENTRATION	2000.000
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.500
			Minimum CONCENTRATION	0.500
			Maximum CONCENTRATION	0.500
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.500
			Minimum CONCENTRATION	0.500
			Maximum CONCENTRATION	0.500
2-Amino-4,6-dinitrotoluene	ORD 1	DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.500
			Minimum CONCENTRATION	0.500
			Maximum CONCENTRATION	0.500
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	1000.182
			Minimum CONCENTRATION	501.000
			Maximum CONCENTRATION	2000.000

COMPOUND_NAME	Area	Type_location	Data	Total
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.500
			Minimum CONCENTRATION	0.500
			Maximum CONCENTRATION	0.500
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	2.000
			Average CONCENTRATION	0.443
			Minimum CONCENTRATION	0.032
			Maximum CONCENTRATION	0.500
4-Amino-2,6-dinitrotoluene	ORD 1	DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.500
			Minimum CONCENTRATION	0.500
			Maximum CONCENTRATION	0.500
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	1000.182
			Minimum CONCENTRATION	501.000
			Maximum CONCENTRATION	2000.000
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.500
			Minimum CONCENTRATION	0.500
			Maximum CONCENTRATION	0.500

COMPOUND_NAME	Area	Type_location	Data	Total
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	1.000
			Average CONCENTRATION	0.482
			Minimum CONCENTRATION	0.300
			Maximum CONCENTRATION	0.500
HMX	ORD 1	DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.500
			Minimum CONCENTRATION	0.500
			Maximum CONCENTRATION	0.500
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	1000.182
			Minimum CONCENTRATION	501.000
			Maximum CONCENTRATION	2000.000
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.500
			Minimum CONCENTRATION	0.500
			Maximum CONCENTRATION	0.500
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.500
			Minimum CONCENTRATION	0.500
			Maximum CONCENTRATION	0.500

COMPOUND_NAME	Area	Type_location	Data	Total
RDX	ORD 1	DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	3.000
			Average CONCENTRATION	1.037
			Minimum CONCENTRATION	0.500
			Maximum CONCENTRATION	3.450
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	1000.182
			Minimum CONCENTRATION	501.000
			Maximum CONCENTRATION	2000.000
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.500
			Minimum CONCENTRATION	0.500
			Maximum CONCENTRATION	0.500
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.500
			Minimum CONCENTRATION	0.500
			Maximum CONCENTRATION	0.500
Arsenic	ORD 1	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	7.000
			Average CONCENTRATION	0.268
			Minimum CONCENTRATION	0.231
			Maximum CONCENTRATION	0.393

COMPOUND_NAME	Area	Type_location	Data	Total
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	0.000
			Average CONCENTRATION	229.500
			Minimum CONCENTRATION	210.000
			Maximum CONCENTRATION	248.000
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.258
			Minimum CONCENTRATION	0.245
			Maximum CONCENTRATION	0.265
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	5.875
			Minimum CONCENTRATION	4.350
			Maximum CONCENTRATION	6.790
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	5.045
			Minimum CONCENTRATION	3.580
			Maximum CONCENTRATION	5.660
	TRA	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	6.000
			Average CONCENTRATION	0.286
			Minimum CONCENTRATION	0.219
			Maximum CONCENTRATION	0.377

COMPOUND_NAME	Area	Type_location	Data	Total
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	0.000
			Average CONCENTRATION	234.700
			Minimum CONCENTRATION	219.000
			Maximum CONCENTRATION	248.000
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.254
			Minimum CONCENTRATION	0.243
			Maximum CONCENTRATION	0.262
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	7.213
			Minimum CONCENTRATION	5.950
			Maximum CONCENTRATION	8.570
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	6.714
			Minimum CONCENTRATION	4.310
			Maximum CONCENTRATION	9.340
Beryllium	ORD 1	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.023
			Minimum CONCENTRATION	0.022
			Maximum CONCENTRATION	0.023

COMPOUND_NAME	Area	Type_location	Data	Total
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	0.000
			Average CONCENTRATION	114.800
			Minimum CONCENTRATION	105.000
			Maximum CONCENTRATION	124.000
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	10.000
			Average CONCENTRATION	0.019
			Minimum CONCENTRATION	0.012
			Maximum CONCENTRATION	0.032
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	0.813
			Minimum CONCENTRATION	0.658
			Maximum CONCENTRATION	0.933
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	0.819
			Minimum CONCENTRATION	0.653
			Maximum CONCENTRATION	1.010
	TRA	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	2.000
			Average CONCENTRATION	0.025
			Minimum CONCENTRATION	0.021
			Maximum CONCENTRATION	0.045

COMPOUND_NAME	Area	Type_location	Data	Total
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	0.000
			Average CONCENTRATION	117.500
			Minimum CONCENTRATION	110.000
			Maximum CONCENTRATION	124.000
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	10.000
			Average CONCENTRATION	0.020
			Minimum CONCENTRATION	0.012
			Maximum CONCENTRATION	0.028
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	0.765
			Minimum CONCENTRATION	0.597
			Maximum CONCENTRATION	0.915
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	0.704
			Minimum CONCENTRATION	0.542
			Maximum CONCENTRATION	0.917
Cadmium	ORD 1	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	2.000
			Average CONCENTRATION	0.064
			Minimum CONCENTRATION	0.058
			Maximum CONCENTRATION	0.086

COMPOUND_NAME	Area	Type_location	Data	Total
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	0.000
			Average CONCENTRATION	114.800
			Minimum CONCENTRATION	105.000
			Maximum CONCENTRATION	124.000
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	0.325
			Minimum CONCENTRATION	0.217
			Maximum CONCENTRATION	0.497
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	0.535
			Minimum CONCENTRATION	0.119
			Maximum CONCENTRATION	0.755
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	0.710
			Minimum CONCENTRATION	0.168
			Maximum CONCENTRATION	1.070
	TRA	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	1.000
			Average CONCENTRATION	0.058
			Minimum CONCENTRATION	0.035
			Maximum CONCENTRATION	0.071

COMPOUND_NAME	Area	Type_location	Data	Total
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	0.000
			Average CONCENTRATION	117.500
			Minimum CONCENTRATION	110.000
			Maximum CONCENTRATION	124.000
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	0.233
			Minimum CONCENTRATION	0.129
			Maximum CONCENTRATION	0.595
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	0.514
			Minimum CONCENTRATION	0.358
			Maximum CONCENTRATION	0.614
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	0.652
			Minimum CONCENTRATION	0.523
			Maximum CONCENTRATION	0.739
Lead	ORD 1	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	2.000
			Average CONCENTRATION	0.218
			Minimum CONCENTRATION	0.210
			Maximum CONCENTRATION	0.264

COMPOUND_NAME	Area	Type_location	Data	Total
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	10.000
			Average CONCENTRATION	259.000
			Minimum CONCENTRATION	198.000
			Maximum CONCENTRATION	348.000
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	0.456
			Minimum CONCENTRATION	0.235
			Maximum CONCENTRATION	0.758
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	13.136
			Minimum CONCENTRATION	11.700
			Maximum CONCENTRATION	14.700
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	15.264
			Minimum CONCENTRATION	13.800
			Maximum CONCENTRATION	17.600
	TRA	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	4.000
			Average CONCENTRATION	0.324
			Minimum CONCENTRATION	0.198
			Maximum CONCENTRATION	0.983

COMPOUND_NAME	Area	Type_location	Data	Total
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	10.000
			Average CONCENTRATION	469.000
			Minimum CONCENTRATION	173.000
			Maximum CONCENTRATION	923.000
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	0.435
			Minimum CONCENTRATION	0.219
			Maximum CONCENTRATION	0.572
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	12.809
			Minimum CONCENTRATION	11.100
			Maximum CONCENTRATION	13.800
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	13.473
			Minimum CONCENTRATION	11.600
			Maximum CONCENTRATION	16.100
Mercury	ORD 1	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	8.000
			Average CONCENTRATION	0.037
			Minimum CONCENTRATION	0.003
			Maximum CONCENTRATION	0.185

COMPOUND_NAME	Area	Type_location	Data	Total
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	10.000
			Average CONCENTRATION	11.660
			Minimum CONCENTRATION	8.500
			Maximum CONCENTRATION	15.800
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	10.000
			Average CONCENTRATION	0.006
			Minimum CONCENTRATION	0.003
			Maximum CONCENTRATION	0.008
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	0.022
			Minimum CONCENTRATION	0.018
			Maximum CONCENTRATION	0.027
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	0.023
			Minimum CONCENTRATION	0.017
			Maximum CONCENTRATION	0.029
	TRA	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	5.000
			Average CONCENTRATION	0.004
			Minimum CONCENTRATION	0.003
			Maximum CONCENTRATION	0.007

COMPOUND_NAME	Area	Type_location	Data	Total
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	10.000
			Average CONCENTRATION	23.230
			Minimum CONCENTRATION	8.500
			Maximum CONCENTRATION	104.000
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	7.000
			Average CONCENTRATION	0.006
			Minimum CONCENTRATION	0.003
			Maximum CONCENTRATION	0.016
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	0.021
			Minimum CONCENTRATION	0.011
			Maximum CONCENTRATION	0.046
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	0.030
			Minimum CONCENTRATION	0.013
			Maximum CONCENTRATION	0.082
Zinc	ORD 1	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	14.512
			Minimum CONCENTRATION	9.530
			Maximum CONCENTRATION	20.200

COMPOUND_NAME	Area	Type_location	Data	Total
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	10.000
			Average CONCENTRATION	56470.000
			Minimum CONCENTRATION	47300.000
			Maximum CONCENTRATION	70500.000
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	24.427
			Minimum CONCENTRATION	18.900
			Maximum CONCENTRATION	29.500
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	122.182
			Minimum CONCENTRATION	102.000
			Maximum CONCENTRATION	155.000
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	131.364
			Minimum CONCENTRATION	109.000
			Maximum CONCENTRATION	175.000
	TRA	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	16.510
			Minimum CONCENTRATION	9.910
			Maximum CONCENTRATION	27.000

COMPOUND_NAME	Area	Type_location	Data	Total
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	10.000
			Average CONCENTRATION	55570.000
			Minimum CONCENTRATION	41300.000
			Maximum CONCENTRATION	82800.000
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	21.791
			Minimum CONCENTRATION	10.700
			Maximum CONCENTRATION	35.200
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	90.609
			Minimum CONCENTRATION	68.300
			Maximum CONCENTRATION	124.000
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	87.745
			Minimum CONCENTRATION	73.100
			Maximum CONCENTRATION	105.000
Americium-241	ORD 1	CRESTED WHEATGR	Number of SAMPLES	22.000
			Number of DETECTS	1.000
			Average CONCENTRATION	0.113
			Minimum CONCENTRATION	-0.408
			Maximum CONCENTRATION	2.590

COMPOUND_NAME	Area	Type_location	Data	Total
		DEER MOUSE	Number of SAMPLES	20.000
			Number of DETECTS	8.000
			Average CONCENTRATION	-0.016
			Minimum CONCENTRATION	-0.544
			Maximum CONCENTRATION	0.083
		SAGEBRUSH	Number of SAMPLES	22.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.016
			Minimum CONCENTRATION	-0.086
			Maximum CONCENTRATION	0.130
		SUBSURFACE SOIL	Number of SAMPLES	22.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.001
			Minimum CONCENTRATION	-0.129
			Maximum CONCENTRATION	0.086
		SURFACE SOIL	Number of SAMPLES	22.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.014
			Minimum CONCENTRATION	-0.081
			Maximum CONCENTRATION	0.090
	TRA	CRESTED WHEATGR	Number of SAMPLES	22.000
			Number of DETECTS	1.000
			Average CONCENTRATION	-0.014
			Minimum CONCENTRATION	-1.000
			Maximum CONCENTRATION	0.326

COMPOUND_NAME	Area	Type_location	Data	Total
		DEER MOUSE	Number of SAMPLES	20.000
			Number of DETECTS	10.000
			Average CONCENTRATION	0.034
			Minimum CONCENTRATION	-0.048
			Maximum CONCENTRATION	0.072
		SAGEBRUSH	Number of SAMPLES	22.000
			Number of DETECTS	1.000
			Average CONCENTRATION	0.022
			Minimum CONCENTRATION	-0.248
			Maximum CONCENTRATION	0.210
		SUBSURFACE SOIL	Number of SAMPLES	22.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.028
			Minimum CONCENTRATION	-0.101
			Maximum CONCENTRATION	0.162
		SURFACE SOIL	Number of SAMPLES	22.000
			Number of DETECTS	2.000
			Average CONCENTRATION	0.035
			Minimum CONCENTRATION	-0.077
			Maximum CONCENTRATION	0.203
Plutonium-238	ORD 1	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.000
			Minimum CONCENTRATION	-0.016
			Maximum CONCENTRATION	0.027

COMPOUND_NAME	Area	Type_location	Data	Total
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.001
			Minimum CONCENTRATION	0.000
			Maximum CONCENTRATION	0.003
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.003
			Minimum CONCENTRATION	-0.007
			Maximum CONCENTRATION	0.015
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.007
			Minimum CONCENTRATION	-0.005
			Maximum CONCENTRATION	0.032
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.012
			Minimum CONCENTRATION	-0.005
			Maximum CONCENTRATION	0.068
	TRA	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.002
			Minimum CONCENTRATION	-0.019
			Maximum CONCENTRATION	0.013

COMPOUND_NAME	Area	Type_location	Data	Total
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.000
			Minimum CONCENTRATION	-0.001
			Maximum CONCENTRATION	0.002
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.001
			Minimum CONCENTRATION	-0.002
			Maximum CONCENTRATION	0.006
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.005
			Minimum CONCENTRATION	-0.012
			Maximum CONCENTRATION	0.032
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.002
			Minimum CONCENTRATION	-0.011
			Maximum CONCENTRATION	0.036
Plutonium-239/240	ORD 1	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.003
			Minimum CONCENTRATION	-0.011
			Maximum CONCENTRATION	0.016

COMPOUND_NAME	Area	Type_location	Data	Total
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.005
			Minimum CONCENTRATION	0.000
			Maximum CONCENTRATION	0.016
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	1.000
			Average CONCENTRATION	0.011
			Minimum CONCENTRATION	-0.009
			Maximum CONCENTRATION	0.093
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.008
			Minimum CONCENTRATION	-0.009
			Maximum CONCENTRATION	0.068
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.010
			Minimum CONCENTRATION	-0.019
			Maximum CONCENTRATION	0.033
	TRA	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.003
			Minimum CONCENTRATION	-0.002
			Maximum CONCENTRATION	0.010

COMPOUND_NAME	Area	Type_location	Data	Total
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.005
			Minimum CONCENTRATION	0.002
			Maximum CONCENTRATION	0.007
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.002
			Minimum CONCENTRATION	-0.005
			Maximum CONCENTRATION	0.011
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.006
			Minimum CONCENTRATION	-0.019
			Maximum CONCENTRATION	0.046
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	1.000
			Average CONCENTRATION	0.032
			Minimum CONCENTRATION	-0.017
			Maximum CONCENTRATION	0.240
Uranium-233/234	ORD 1	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.021
			Minimum CONCENTRATION	-0.007
			Maximum CONCENTRATION	0.043

COMPOUND_NAME	Area	Type_location	Data	Total
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.028
			Minimum CONCENTRATION	0.014
			Maximum CONCENTRATION	0.047
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	0.983
			Minimum CONCENTRATION	0.775
			Maximum CONCENTRATION	1.230
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	0.975
			Minimum CONCENTRATION	0.759
			Maximum CONCENTRATION	1.190
	TRA	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	4.000
			Average CONCENTRATION	0.046
			Minimum CONCENTRATION	0.003
			Maximum CONCENTRATION	0.088
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	1.000
			Average CONCENTRATION	0.028
			Minimum CONCENTRATION	0.005
			Maximum CONCENTRATION	0.058

COMPOUND_NAME	Area	Type_location	Data	Total
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	1.021
			Minimum CONCENTRATION	0.724
			Maximum CONCENTRATION	1.460
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	0.895
			Minimum CONCENTRATION	0.691
			Maximum CONCENTRATION	1.160
Uranium-235	ORD 1	CRESTED WHEATGR	Number of SAMPLES	22.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.145
			Minimum CONCENTRATION	-0.007
			Maximum CONCENTRATION	0.515
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.037
			Minimum CONCENTRATION	0.001
			Maximum CONCENTRATION	0.075
		SAGEBRUSH	Number of SAMPLES	22.000
			Number of DETECTS	2.000
			Average CONCENTRATION	0.074
			Minimum CONCENTRATION	-0.077
			Maximum CONCENTRATION	0.292

COMPOUND_NAME	Area	Type_location	Data	Total
		SUBSURFACE SOIL	Number of SAMPLES	22.000
			Number of DETECTS	6.000
			Average CONCENTRATION	0.124
			Minimum CONCENTRATION	0.012
			Maximum CONCENTRATION	0.556
		SURFACE SOIL	Number of SAMPLES	22.000
			Number of DETECTS	7.000
			Average CONCENTRATION	0.126
			Minimum CONCENTRATION	-0.051
			Maximum CONCENTRATION	0.471
	TRA	CRESTED WHEATGR	Number of SAMPLES	22.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.175
			Minimum CONCENTRATION	-0.007
			Maximum CONCENTRATION	0.635
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.035
			Minimum CONCENTRATION	0.005
			Maximum CONCENTRATION	0.065
		SAGEBRUSH	Number of SAMPLES	22.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.056
			Minimum CONCENTRATION	-0.014
			Maximum CONCENTRATION	0.191

COMPOUND_NAME	Area	Type_location	Data	Total
		SUBSURFACE SOIL	Number of SAMPLES	22.000
			Number of DETECTS	3.000
			Average CONCENTRATION	0.099
			Minimum CONCENTRATION	0.026
			Maximum CONCENTRATION	0.195
		SURFACE SOIL	Number of SAMPLES	22.000
			Number of DETECTS	4.000
			Average CONCENTRATION	0.087
			Minimum CONCENTRATION	-0.011
			Maximum CONCENTRATION	0.248
Uranium-238	ORD 1	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	2.000
			Average CONCENTRATION	0.012
			Minimum CONCENTRATION	-0.001
			Maximum CONCENTRATION	0.036
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.003
			Minimum CONCENTRATION	-0.002
			Maximum CONCENTRATION	0.008
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	4.000
			Average CONCENTRATION	0.020
			Minimum CONCENTRATION	0.000
			Maximum CONCENTRATION	0.042

COMPOUND_NAME	Area	Type_location	Data	Total
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	1.022
			Minimum CONCENTRATION	0.714
			Maximum CONCENTRATION	1.220
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	0.956
			Minimum CONCENTRATION	0.771
			Maximum CONCENTRATION	1.180
	TRA	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	1.000
			Average CONCENTRATION	0.015
			Minimum CONCENTRATION	0.000
			Maximum CONCENTRATION	0.035
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.004
			Minimum CONCENTRATION	-0.004
			Maximum CONCENTRATION	0.016
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	3.000
			Average CONCENTRATION	0.014
			Minimum CONCENTRATION	-0.006
			Maximum CONCENTRATION	0.027

COMPOUND_NAME	Area	Type_location	Data	Total
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	1.069
			Minimum CONCENTRATION	0.788
			Maximum CONCENTRATION	1.410
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	1.020
			Minimum CONCENTRATION	0.798
			Maximum CONCENTRATION	1.220
Thorium-228	ORD 1	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	1.000
			Average CONCENTRATION	0.022
			Minimum CONCENTRATION	-0.020
			Maximum CONCENTRATION	0.064
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	2.000
			Average CONCENTRATION	0.032
			Minimum CONCENTRATION	-0.010
			Maximum CONCENTRATION	0.056
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	1.655
			Minimum CONCENTRATION	1.130
			Maximum CONCENTRATION	1.980

COMPOUND_NAME	Area	Type_location	Data	Total
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	1.541
			Minimum CONCENTRATION	1.030
			Maximum CONCENTRATION	1.790
	TRA	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.032
			Minimum CONCENTRATION	-0.004
			Maximum CONCENTRATION	0.054
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	4.000
			Average CONCENTRATION	0.036
			Minimum CONCENTRATION	0.005
			Maximum CONCENTRATION	0.075
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	1.617
			Minimum CONCENTRATION	1.130
			Maximum CONCENTRATION	2.420
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	1.497
			Minimum CONCENTRATION	1.260
			Maximum CONCENTRATION	1.660

COMPOUND_NAME	Area	Type_location	Data	Total
Thorium-230	ORD 1	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	1.000
			Average CONCENTRATION	0.080
			Minimum CONCENTRATION	0.023
			Maximum CONCENTRATION	0.157
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	6.000
			Average CONCENTRATION	0.065
			Minimum CONCENTRATION	0.006
			Maximum CONCENTRATION	0.112
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	1.787
			Minimum CONCENTRATION	1.220
			Maximum CONCENTRATION	2.750
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	1.820
			Minimum CONCENTRATION	1.470
			Maximum CONCENTRATION	2.500
	TRA	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	1.000
			Average CONCENTRATION	0.080
			Minimum CONCENTRATION	0.010
			Maximum CONCENTRATION	0.186

COMPOUND_NAME	Area	Type_location	Data	Total
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	4.000
			Average CONCENTRATION	0.077
			Minimum CONCENTRATION	0.036
			Maximum CONCENTRATION	0.138
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	1.446
			Minimum CONCENTRATION	1.010
			Maximum CONCENTRATION	2.080
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	1.528
			Minimum CONCENTRATION	1.320
			Maximum CONCENTRATION	2.090
Thorium-232	ORD 1	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	2.000
			Average CONCENTRATION	0.026
			Minimum CONCENTRATION	0.015
			Maximum CONCENTRATION	0.053
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	5.000
			Average CONCENTRATION	0.024
			Minimum CONCENTRATION	0.008
			Maximum CONCENTRATION	0.057

COMPOUND_NAME	Area	Type_location	Data	Total
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	1.544
			Minimum CONCENTRATION	1.020
			Maximum CONCENTRATION	2.320
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	1.465
			Minimum CONCENTRATION	1.200
			Maximum CONCENTRATION	1.860
	TRA	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	2.000
			Average CONCENTRATION	0.020
			Minimum CONCENTRATION	-0.004
			Maximum CONCENTRATION	0.055
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	7.000
			Average CONCENTRATION	0.025
			Minimum CONCENTRATION	0.005
			Maximum CONCENTRATION	0.050
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	1.404
			Minimum CONCENTRATION	0.952
			Maximum CONCENTRATION	1.840

COMPOUND_NAME	Area	Type_location	Data	Total
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	1.360
			Minimum CONCENTRATION	0.911
			Maximum CONCENTRATION	1.670
Strontium-90	ORD 1	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.071
			Minimum CONCENTRATION	-0.087
			Maximum CONCENTRATION	0.141
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.022
			Minimum CONCENTRATION	-0.120
			Maximum CONCENTRATION	0.110
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.185
			Minimum CONCENTRATION	0.022
			Maximum CONCENTRATION	0.414
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.117
			Minimum CONCENTRATION	-0.037
			Maximum CONCENTRATION	0.453

COMPOUND_NAME	Area	Type_location	Data	Total
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	3.000
			Average CONCENTRATION	0.339
			Minimum CONCENTRATION	0.129
			Maximum CONCENTRATION	0.658
	TRA	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	2.000
			Average CONCENTRATION	0.143
			Minimum CONCENTRATION	-0.029
			Maximum CONCENTRATION	0.484
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	3.000
			Average CONCENTRATION	0.308
			Minimum CONCENTRATION	-0.130
			Maximum CONCENTRATION	1.820
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	1.000
			Average CONCENTRATION	0.481
			Minimum CONCENTRATION	-0.125
			Maximum CONCENTRATION	3.850
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.080
			Minimum CONCENTRATION	-0.096
			Maximum CONCENTRATION	0.220

COMPOUND_NAME	Area	Type_location	Data	Total
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	1.000
			Average CONCENTRATION	0.163
			Minimum CONCENTRATION	0.014
			Maximum CONCENTRATION	0.399
Silver-108m	ORD 1	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.002
			Minimum CONCENTRATION	-0.038
			Maximum CONCENTRATION	0.072
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.011
			Minimum CONCENTRATION	-0.019
			Maximum CONCENTRATION	0.064
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.002
			Minimum CONCENTRATION	-0.032
			Maximum CONCENTRATION	0.019
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.002
			Minimum CONCENTRATION	-0.010
			Maximum CONCENTRATION	0.020

COMPOUND_NAME	Area	Type_location	Data	Total
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.014
			Minimum CONCENTRATION	-0.010
			Maximum CONCENTRATION	0.078
	TRA	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.002
			Minimum CONCENTRATION	-0.029
			Maximum CONCENTRATION	0.034
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.004
			Minimum CONCENTRATION	-0.021
			Maximum CONCENTRATION	0.006
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.003
			Minimum CONCENTRATION	-0.028
			Maximum CONCENTRATION	0.057
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.000
			Minimum CONCENTRATION	-0.021
			Maximum CONCENTRATION	0.021

COMPOUND_NAME	Area	Type_location	Data	Total
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.027
			Minimum CONCENTRATION	-0.017
			Maximum CONCENTRATION	0.215
Silver-110m	ORD 1	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.006
			Minimum CONCENTRATION	-0.079
			Maximum CONCENTRATION	0.062
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.011
			Minimum CONCENTRATION	-0.043
			Maximum CONCENTRATION	0.028
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.003
			Minimum CONCENTRATION	-0.027
			Maximum CONCENTRATION	0.027
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.006
			Minimum CONCENTRATION	-0.020
			Maximum CONCENTRATION	0.030

COMPOUND_NAME	Area	Type_location	Data	Total
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	1.000
			Average CONCENTRATION	0.015
			Minimum CONCENTRATION	-0.025
			Maximum CONCENTRATION	0.080
	TRA	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.013
			Minimum CONCENTRATION	-0.055
			Maximum CONCENTRATION	0.034
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.003
			Minimum CONCENTRATION	-0.098
			Maximum CONCENTRATION	0.052
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.000
			Minimum CONCENTRATION	-0.045
			Maximum CONCENTRATION	0.056
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.010
			Minimum CONCENTRATION	-0.021
			Maximum CONCENTRATION	0.056

COMPOUND_NAME	Area	Type_location	Data	Total
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.023
			Minimum CONCENTRATION	-0.005
			Maximum CONCENTRATION	0.065
Cerium-144	ORD 1	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.022
			Minimum CONCENTRATION	-0.188
			Maximum CONCENTRATION	0.192
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.043
			Minimum CONCENTRATION	-0.204
			Maximum CONCENTRATION	0.067
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.008
			Minimum CONCENTRATION	-0.120
			Maximum CONCENTRATION	0.173
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.029
			Minimum CONCENTRATION	-0.231
			Maximum CONCENTRATION	0.214

COMPOUND_NAME	Area	Type_location	Data	Total
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.021
			Minimum CONCENTRATION	-0.172
			Maximum CONCENTRATION	0.138
	TRA	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.038
			Minimum CONCENTRATION	-0.153
			Maximum CONCENTRATION	0.224
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.060
			Minimum CONCENTRATION	-0.234
			Maximum CONCENTRATION	0.188
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.072
			Minimum CONCENTRATION	-0.085
			Maximum CONCENTRATION	0.231
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.053
			Minimum CONCENTRATION	-0.204
			Maximum CONCENTRATION	0.129

COMPOUND_NAME	Area	Type_location	Data	Total
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.018
			Minimum CONCENTRATION	-0.187
			Maximum CONCENTRATION	0.142
Cobalt-58	ORD 1	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.004
			Minimum CONCENTRATION	-0.071
			Maximum CONCENTRATION	0.070
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.018
			Minimum CONCENTRATION	-0.046
			Maximum CONCENTRATION	0.030
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.022
			Minimum CONCENTRATION	-0.039
			Maximum CONCENTRATION	0.113
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.007
			Minimum CONCENTRATION	-0.039
			Maximum CONCENTRATION	0.032

COMPOUND_NAME	Area	Type_location	Data	Total
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.011
			Minimum CONCENTRATION	-0.052
			Maximum CONCENTRATION	0.022
	TRA	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.005
			Minimum CONCENTRATION	-0.087
			Maximum CONCENTRATION	0.076
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.019
			Minimum CONCENTRATION	-0.108
			Maximum CONCENTRATION	0.162
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.015
			Minimum CONCENTRATION	-0.087
			Maximum CONCENTRATION	0.024
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.006
			Minimum CONCENTRATION	-0.033
			Maximum CONCENTRATION	0.042

COMPOUND_NAME	Area	Type_location	Data	Total
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.002
			Minimum CONCENTRATION	-0.026
			Maximum CONCENTRATION	0.058
Cobalt-60	ORD 1	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	1.000
			Average CONCENTRATION	0.149
			Minimum CONCENTRATION	-0.057
			Maximum CONCENTRATION	1.120
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.015
			Minimum CONCENTRATION	-0.024
			Maximum CONCENTRATION	0.046
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.009
			Minimum CONCENTRATION	-0.036
			Maximum CONCENTRATION	0.040
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.004
			Minimum CONCENTRATION	-0.019
			Maximum CONCENTRATION	0.076

COMPOUND_NAME	Area	Type_location	Data	Total
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.010
			Minimum CONCENTRATION	-0.024
			Maximum CONCENTRATION	0.062
	TRA	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.040
			Minimum CONCENTRATION	-0.077
			Maximum CONCENTRATION	0.235
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	2.000
			Average CONCENTRATION	1.151
			Minimum CONCENTRATION	-0.031
			Maximum CONCENTRATION	10.200
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.014
			Minimum CONCENTRATION	-0.025
			Maximum CONCENTRATION	0.053
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	1.000
			Average CONCENTRATION	0.041
			Minimum CONCENTRATION	-0.008
			Maximum CONCENTRATION	0.143

COMPOUND_NAME	Area	Type_location	Data	Total
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	7.000
			Average CONCENTRATION	0.163
			Minimum CONCENTRATION	0.015
			Maximum CONCENTRATION	0.906
Cesium-134	ORD 1	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.005
			Minimum CONCENTRATION	-0.071
			Maximum CONCENTRATION	0.129
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.020
			Minimum CONCENTRATION	-0.017
			Maximum CONCENTRATION	0.132
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.011
			Minimum CONCENTRATION	-0.039
			Maximum CONCENTRATION	0.013
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.003
			Minimum CONCENTRATION	-0.020
			Maximum CONCENTRATION	0.031

COMPOUND_NAME	Area	Type_location	Data	Total
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.008
			Minimum CONCENTRATION	-0.075
			Maximum CONCENTRATION	0.016
	TRA	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.017
			Minimum CONCENTRATION	-0.144
			Maximum CONCENTRATION	0.078
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.018
			Minimum CONCENTRATION	-0.041
			Maximum CONCENTRATION	0.058
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.025
			Minimum CONCENTRATION	-0.026
			Maximum CONCENTRATION	0.166
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.003
			Minimum CONCENTRATION	-0.016
			Maximum CONCENTRATION	0.019

COMPOUND_NAME	Area	Type_location	Data	Total
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.008
			Minimum CONCENTRATION	-0.079
			Maximum CONCENTRATION	0.013
Cesium-137	ORD 1	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	5.000
			Average CONCENTRATION	0.290
			Minimum CONCENTRATION	0.002
			Maximum CONCENTRATION	1.350
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.036
			Minimum CONCENTRATION	-0.009
			Maximum CONCENTRATION	0.076
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	1.000
			Average CONCENTRATION	0.033
			Minimum CONCENTRATION	-0.021
			Maximum CONCENTRATION	0.182
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	8.000
			Average CONCENTRATION	0.103
			Minimum CONCENTRATION	0.030
			Maximum CONCENTRATION	0.278

COMPOUND_NAME	Area	Type_location	Data	Total
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	0.923
			Minimum CONCENTRATION	0.477
			Maximum CONCENTRATION	2.210
	TRA	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	1.000
			Average CONCENTRATION	0.071
			Minimum CONCENTRATION	-0.005
			Maximum CONCENTRATION	0.376
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	3.000
			Average CONCENTRATION	0.134
			Minimum CONCENTRATION	0.002
			Maximum CONCENTRATION	0.547
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	2.000
			Average CONCENTRATION	0.073
			Minimum CONCENTRATION	0.000
			Maximum CONCENTRATION	0.352
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	0.458
			Minimum CONCENTRATION	0.077
			Maximum CONCENTRATION	1.780

COMPOUND_NAME	Area	Type_location	Data	Total
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	1.427
			Minimum CONCENTRATION	0.665
			Maximum CONCENTRATION	5.030
Europium-152	ORD 1	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.035
			Minimum CONCENTRATION	-0.075
			Maximum CONCENTRATION	0.159
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.012
			Minimum CONCENTRATION	-0.136
			Maximum CONCENTRATION	0.138
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.015
			Minimum CONCENTRATION	-0.130
			Maximum CONCENTRATION	0.091
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.041
			Minimum CONCENTRATION	-0.103
			Maximum CONCENTRATION	0.034

COMPOUND_NAME	Area	Type_location	Data	Total
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.004
			Minimum CONCENTRATION	-0.054
			Maximum CONCENTRATION	0.055
	TRA	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.016
			Minimum CONCENTRATION	-0.110
			Maximum CONCENTRATION	0.096
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.077
			Minimum CONCENTRATION	-0.039
			Maximum CONCENTRATION	0.171
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.002
			Minimum CONCENTRATION	-0.092
			Maximum CONCENTRATION	0.055
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.008
			Minimum CONCENTRATION	-0.051
			Maximum CONCENTRATION	0.072

COMPOUND_NAME	Area	Type_location	Data	Total
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	1.000
			Average CONCENTRATION	0.100
			Minimum CONCENTRATION	-0.084
			Maximum CONCENTRATION	0.859
Europium-154	ORD 1	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.057
			Minimum CONCENTRATION	-0.100
			Maximum CONCENTRATION	0.244
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.073
			Minimum CONCENTRATION	-0.197
			Maximum CONCENTRATION	0.365
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.001
			Minimum CONCENTRATION	-0.124
			Maximum CONCENTRATION	0.072
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.012
			Minimum CONCENTRATION	-0.072
			Maximum CONCENTRATION	0.166

COMPOUND_NAME	Area	Type_location	Data	Total
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	1.000
			Average CONCENTRATION	0.011
			Minimum CONCENTRATION	-0.063
			Maximum CONCENTRATION	0.180
	TRA	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.054
			Minimum CONCENTRATION	-0.097
			Maximum CONCENTRATION	0.298
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.065
			Minimum CONCENTRATION	-0.176
			Maximum CONCENTRATION	0.331
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.009
			Minimum CONCENTRATION	-0.122
			Maximum CONCENTRATION	0.083
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.004
			Minimum CONCENTRATION	-0.037
			Maximum CONCENTRATION	0.075

COMPOUND_NAME	Area	Type_location	Data	Total
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.008
			Minimum CONCENTRATION	-0.075
			Maximum CONCENTRATION	0.122
Europium-155	ORD 1	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.043
			Minimum CONCENTRATION	-0.159
			Maximum CONCENTRATION	0.179
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.080
			Minimum CONCENTRATION	-0.008
			Maximum CONCENTRATION	0.150
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.011
			Minimum CONCENTRATION	-0.083
			Maximum CONCENTRATION	0.059
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.109
			Minimum CONCENTRATION	0.049
			Maximum CONCENTRATION	0.345

COMPOUND_NAME	Area	Type_location	Data	Total
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.096
			Minimum CONCENTRATION	0.009
			Maximum CONCENTRATION	0.159
	TRA	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.044
			Minimum CONCENTRATION	-0.056
			Maximum CONCENTRATION	0.189
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.086
			Minimum CONCENTRATION	-0.025
			Maximum CONCENTRATION	0.158
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.015
			Minimum CONCENTRATION	-0.096
			Maximum CONCENTRATION	0.060
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.067
			Minimum CONCENTRATION	-0.028
			Maximum CONCENTRATION	0.181

COMPOUND_NAME	Area	Type_location	Data	Total
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.081
			Minimum CONCENTRATION	0.028
			Maximum CONCENTRATION	0.149
Potassium-40	ORD 1	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	6.555
			Minimum CONCENTRATION	4.710
			Maximum CONCENTRATION	8.930
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	9.000
			Average CONCENTRATION	3.292
			Minimum CONCENTRATION	1.670
			Maximum CONCENTRATION	4.260
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	10.455
			Minimum CONCENTRATION	7.270
			Maximum CONCENTRATION	12.900
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	20.355
			Minimum CONCENTRATION	18.200
			Maximum CONCENTRATION	21.800

COMPOUND_NAME	Area	Type_location	Data	Total
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	21.636
			Minimum CONCENTRATION	20.100
			Maximum CONCENTRATION	22.700
	TRA	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	11.392
			Minimum CONCENTRATION	8.710
			Maximum CONCENTRATION	17.200
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	10.000
			Average CONCENTRATION	3.543
			Minimum CONCENTRATION	0.290
			Maximum CONCENTRATION	5.770
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	9.685
			Minimum CONCENTRATION	7.820
			Maximum CONCENTRATION	11.900
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	20.691
			Minimum CONCENTRATION	19.800
			Maximum CONCENTRATION	21.400

COMPOUND_NAME	Area	Type_location	Data	Total
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	20.591
			Minimum CONCENTRATION	19.000
			Maximum CONCENTRATION	23.100
Manganese-54	ORD 1	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.011
			Minimum CONCENTRATION	-0.092
			Maximum CONCENTRATION	0.043
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.000
			Minimum CONCENTRATION	-0.044
			Maximum CONCENTRATION	0.055
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.002
			Minimum CONCENTRATION	-0.034
			Maximum CONCENTRATION	0.033
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.008
			Minimum CONCENTRATION	-0.016
			Maximum CONCENTRATION	0.029

COMPOUND_NAME	Area	Type_location	Data	Total
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.008
			Minimum CONCENTRATION	-0.046
			Maximum CONCENTRATION	0.048
	TRA	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.030
			Minimum CONCENTRATION	-0.015
			Maximum CONCENTRATION	0.072
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.011
			Minimum CONCENTRATION	-0.034
			Maximum CONCENTRATION	0.050
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.005
			Minimum CONCENTRATION	-0.027
			Maximum CONCENTRATION	0.026
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.018
			Minimum CONCENTRATION	-0.013
			Maximum CONCENTRATION	0.046

COMPOUND_NAME	Area	Type_location	Data	Total
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.024
			Minimum CONCENTRATION	-0.008
			Maximum CONCENTRATION	0.052
Niobium-95	ORD 1	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.085
			Minimum CONCENTRATION	-0.091
			Maximum CONCENTRATION	0.208
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.071
			Minimum CONCENTRATION	-0.147
			Maximum CONCENTRATION	0.218
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.023
			Minimum CONCENTRATION	-0.030
			Maximum CONCENTRATION	0.074
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.048
			Minimum CONCENTRATION	0.017
			Maximum CONCENTRATION	0.084

COMPOUND_NAME	Area	Type_location	Data	Total
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.091
			Minimum CONCENTRATION	-0.062
			Maximum CONCENTRATION	0.227
	TRA	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.079
			Minimum CONCENTRATION	-0.137
			Maximum CONCENTRATION	0.435
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.128
			Minimum CONCENTRATION	-0.095
			Maximum CONCENTRATION	0.364
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.040
			Minimum CONCENTRATION	-0.065
			Maximum CONCENTRATION	0.111
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.114
			Minimum CONCENTRATION	-0.027
			Maximum CONCENTRATION	0.343

COMPOUND_NAME	Area	Type_location	Data	Total
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.086
			Minimum CONCENTRATION	-0.006
			Maximum CONCENTRATION	0.267
Radium-226	ORD 1	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.175
			Minimum CONCENTRATION	0.001
			Maximum CONCENTRATION	0.304
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.581
			Minimum CONCENTRATION	-0.078
			Maximum CONCENTRATION	1.200
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	1.000
			Average CONCENTRATION	0.071
			Minimum CONCENTRATION	0.028
			Maximum CONCENTRATION	0.152
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	1.285
			Minimum CONCENTRATION	1.040
			Maximum CONCENTRATION	1.590

COMPOUND_NAME	Area	Type_location	Data	Total
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	1.333
			Minimum CONCENTRATION	1.170
			Maximum CONCENTRATION	1.630
	TRA	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.167
			Minimum CONCENTRATION	0.045
			Maximum CONCENTRATION	0.453
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.502
			Minimum CONCENTRATION	0.077
			Maximum CONCENTRATION	1.040
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	1.000
			Average CONCENTRATION	0.085
			Minimum CONCENTRATION	0.018
			Maximum CONCENTRATION	0.188
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	1.208
			Minimum CONCENTRATION	1.090
			Maximum CONCENTRATION	1.380

COMPOUND_NAME	Area	Type_location	Data	Total
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	11.000
			Average CONCENTRATION	1.235
			Minimum CONCENTRATION	0.970
			Maximum CONCENTRATION	1.490
Ruthenium-103	ORD 1	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.012
			Minimum CONCENTRATION	-0.094
			Maximum CONCENTRATION	0.125
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.005
			Minimum CONCENTRATION	-0.070
			Maximum CONCENTRATION	0.091
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.019
			Minimum CONCENTRATION	-0.070
			Maximum CONCENTRATION	0.033
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.013
			Minimum CONCENTRATION	-0.025
			Maximum CONCENTRATION	0.058

COMPOUND_NAME	Area	Type_location	Data	Total
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.001
			Minimum CONCENTRATION	-0.040
			Maximum CONCENTRATION	0.047
	TRA	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.010
			Minimum CONCENTRATION	-0.082
			Maximum CONCENTRATION	0.106
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.028
			Minimum CONCENTRATION	-0.217
			Maximum CONCENTRATION	0.157
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.003
			Minimum CONCENTRATION	-0.074
			Maximum CONCENTRATION	0.073
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.009
			Minimum CONCENTRATION	-0.031
			Maximum CONCENTRATION	0.068

COMPOUND_NAME	Area	Type_location	Data	Total
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.004
			Minimum CONCENTRATION	-0.075
			Maximum CONCENTRATION	0.045
Ruthenium-106	ORD 1	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	1.000
			Average CONCENTRATION	-0.027
			Minimum CONCENTRATION	-0.626
			Maximum CONCENTRATION	0.938
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.093
			Minimum CONCENTRATION	-0.425
			Maximum CONCENTRATION	0.340
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.002
			Minimum CONCENTRATION	-0.342
			Maximum CONCENTRATION	0.295
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.043
			Minimum CONCENTRATION	-0.208
			Maximum CONCENTRATION	0.295

COMPOUND_NAME	Area	Type_location	Data	Total
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.045
			Minimum CONCENTRATION	-0.342
			Maximum CONCENTRATION	0.227
	TRA	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.014
			Minimum CONCENTRATION	-0.458
			Maximum CONCENTRATION	0.657
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.052
			Minimum CONCENTRATION	-0.349
			Maximum CONCENTRATION	0.674
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.233
			Minimum CONCENTRATION	-0.197
			Maximum CONCENTRATION	1.190
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.033
			Minimum CONCENTRATION	-0.144
			Maximum CONCENTRATION	0.239

COMPOUND_NAME	Area	Type_location	Data	Total
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.056
			Minimum CONCENTRATION	-0.212
			Maximum CONCENTRATION	0.148
Antimony-125	ORD 1	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.013
			Minimum CONCENTRATION	-0.212
			Maximum CONCENTRATION	0.079
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.031
			Minimum CONCENTRATION	-0.218
			Maximum CONCENTRATION	0.028
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.000
			Minimum CONCENTRATION	-0.082
			Maximum CONCENTRATION	0.177
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.028
			Minimum CONCENTRATION	-0.040
			Maximum CONCENTRATION	0.086

COMPOUND_NAME	Area	Type_location	Data	Total
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.024
			Minimum CONCENTRATION	-0.019
			Maximum CONCENTRATION	0.126
	TRA	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.008
			Minimum CONCENTRATION	-0.157
			Maximum CONCENTRATION	0.116
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.006
			Minimum CONCENTRATION	-0.100
			Maximum CONCENTRATION	0.097
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.005
			Minimum CONCENTRATION	-0.114
			Maximum CONCENTRATION	0.174
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.003
			Minimum CONCENTRATION	-0.056
			Maximum CONCENTRATION	0.064

COMPOUND_NAME	Area	Type_location	Data	Total
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.018
			Minimum CONCENTRATION	-0.023
			Maximum CONCENTRATION	0.094
Zinc-65	ORD 1	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.105
			Minimum CONCENTRATION	-0.210
			Maximum CONCENTRATION	0.046
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.015
			Minimum CONCENTRATION	-0.225
			Maximum CONCENTRATION	0.213
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.007
			Minimum CONCENTRATION	-0.092
			Maximum CONCENTRATION	0.072
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.021
			Minimum CONCENTRATION	-0.290
			Maximum CONCENTRATION	0.059

COMPOUND_NAME	Area	Type_location	Data	Total
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.017
			Minimum CONCENTRATION	-0.032
			Maximum CONCENTRATION	0.116
	TRA	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.007
			Minimum CONCENTRATION	-0.084
			Maximum CONCENTRATION	0.113
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	1.000
			Average CONCENTRATION	1.364
			Minimum CONCENTRATION	0.005
			Maximum CONCENTRATION	12.300
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.005
			Minimum CONCENTRATION	-0.086
			Maximum CONCENTRATION	0.043
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.021
			Minimum CONCENTRATION	-0.135
			Maximum CONCENTRATION	0.027

COMPOUND_NAME	Area	Type_location	Data	Total
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.027
			Minimum CONCENTRATION	-0.231
			Maximum CONCENTRATION	0.040
Zirconium-95	ORD 1	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.049
			Minimum CONCENTRATION	-0.111
			Maximum CONCENTRATION	0.161
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.003
			Minimum CONCENTRATION	-0.147
			Maximum CONCENTRATION	0.104
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.029
			Minimum CONCENTRATION	-0.039
			Maximum CONCENTRATION	0.146
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.023
			Minimum CONCENTRATION	-0.080
			Maximum CONCENTRATION	0.085

COMPOUND_NAME	Area	Type_location	Data	Total
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.027
			Minimum CONCENTRATION	-0.058
			Maximum CONCENTRATION	0.107
	TRA	CRESTED WHEATGR	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.047
			Minimum CONCENTRATION	-0.220
			Maximum CONCENTRATION	0.336
		DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.005
			Minimum CONCENTRATION	-0.210
			Maximum CONCENTRATION	0.130
		SAGEBRUSH	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.023
			Minimum CONCENTRATION	-0.040
			Maximum CONCENTRATION	0.108
		SUBSURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.027
			Minimum CONCENTRATION	-0.066
			Maximum CONCENTRATION	0.119

COMPOUND_NAME	Area	Type_location	Data	Total
		SURFACE SOIL	Number of SAMPLES	11.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.008
			Minimum CONCENTRATION	-0.112
			Maximum CONCENTRATION	0.077
Uranium-234	ORD 1	DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.000
			Minimum CONCENTRATION	-0.017
			Maximum CONCENTRATION	0.023
	TRA	DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.001
			Minimum CONCENTRATION	-0.016
			Maximum CONCENTRATION	0.019
Uranium-235/236	ORD 1	DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	0.000
			Average CONCENTRATION	-0.004
			Minimum CONCENTRATION	-0.020
			Maximum CONCENTRATION	0.014
	TRA	DEER MOUSE	Number of SAMPLES	10.000
			Number of DETECTS	0.000
			Average CONCENTRATION	0.006
			Minimum CONCENTRATION	-0.007
			Maximum CONCENTRATION	0.015

Appendix F

Plant Population Data

Appendix F

Plant Population Data

Table F-1. Summary of plant cover classes by plot frame.

Quarter Plots					Half Plots					Whole Plots				
Sum of Average Quarter Plot	Area				Sum of Average Half Plot	Area				Sum of Average Whole Plot	Area			
Species	1REF	2REF	ORD	TRA	Species	1REF	2REF	ORD	TRA	Species	1REF	2REF	ORD	TRA
AGCR	0.00%	0.00%	6.12%	3.67%	AGCR	0.00%	0.00%	6.83%	3.82%	AGCR	0.00%	0.00%	5.33%	3.78%
ALAL	0.00%	0.00%	0.00%	0.00%	ALAL	0.00%	0.00%	0.00%	0.00%	ALAL	0.00%	0.00%	0.00%	0.00%
ALDE	0.00%	0.01%	0.42%	0.13%	ALDE	0.06%	0.01%	0.50%	0.17%	ALDE	0.02%	0.02%	0.51%	0.21%
ARCA	0.00%	0.00%	0.00%	0.34%	ARCA	0.00%	0.00%	0.00%	0.22%	ARCA	0.00%	0.00%	0.00%	0.23%
ARCO	0.00%	0.00%	0.01%	0.00%	ARCO	0.00%	0.00%	0.01%	0.00%	ARCO	0.00%	0.00%	0.04%	0.00%
ARFR	0.00%	0.00%	0.07%	0.00%	ARFR	0.00%	0.00%	0.15%	0.00%	ARFR	0.00%	0.00%	0.11%	0.00%
ARTR	5.13%	7.88%	2.56%	3.08%	ARTR	6.00%	8.48%	2.75%	2.71%	ARTR	6.64%	8.76%	7.06%	3.15%
ARTR-D	5.39%	8.98%	4.76%	1.14%	ARTR-D	4.89%	9.87%	5.73%	1.29%	ARTR-D	6.63%	10.95%	5.95%	1.47%
ASFI	0.01%	0.00%	0.01%	0.17%	ASFI	0.01%	0.00%	0.04%	0.12%	ASFI	0.03%	0.00%	0.04%	0.15%
ASLE	0.01%	0.00%	0.01%	0.03%	ASLE	0.02%	0.00%	0.01%	0.11%	ASLE	0.02%	0.00%	0.01%	0.08%
ATCO	0.00%	0.28%	0.09%	0.00%	ATCO	0.00%	0.26%	0.15%	0.00%	ATCO	0.00%	0.18%	0.41%	0.00%
ATFA	0.00%	0.00%	0.00%	0.00%	ATFA	0.00%	0.00%	0.04%	0.00%	ATFA	0.00%	0.00%	0.03%	0.00%
Bare ground	30.41%	33.89%	33.76%	26.30%	Bare ground	29.90%	31.21%	32.08%	25.09%	Bare ground	26.74%	30.34%	28.11%	24.79%
BASA	0.00%	0.00%	0.00%	0.00%	BASA	0.06%	0.00%	0.00%	0.00%	BASA	0.05%	0.00%	0.00%	0.00%
BRTE	2.20%	0.08%	0.17%	0.94%	BRTE	2.48%	0.03%	0.27%	1.16%	BRTE	2.79%	0.23%	0.28%	1.36%
CADO	0.00%	0.44%	2.03%	0.00%	CADO	0.00%	0.31%	2.16%	0.00%	CADO	0.00%	0.27%	2.18%	0.00%
CHDO	0.00%	0.00%	0.05%	0.05%	CHDO	0.07%	0.01%	0.03%	0.06%	CHDO	0.10%	0.07%	0.12%	0.09%
CHNA	0.49%	0.00%	0.08%	1.20%	CHNA	0.33%	0.00%	0.06%	1.41%	CHNA	0.28%	0.00%	0.07%	1.07%

Table F-1. (continued).

Quarter Plots					Half Plots					Whole Plots				
Sum of Average Quarter Plot	Area				Sum of Average Half Plot	Area				Sum of Average Whole Plot	Area			
Species	1REF	2REF	ORD	TRA	Species	1REF	2REF	ORD	TRA	Species	1REF	2REF	ORD	TRA
CHVI	4.47%	5.69%	3.92%	3.24%	CHVI	4.89%	6.43%	3.44%	3.92%	CHVI	4.36%	6.32%	3.74%	4.48%
CRAC	0.26%	0.00%	0.04%	0.01%	CRAC	0.14%	0.00%	0.04%	0.00%	CRAC	0.14%	0.00%	0.03%	0.01%
CRTO	0.07%	0.00%	0.00%	0.00%	CRTO	0.01%	0.00%	0.00%	0.00%	CRTO	0.01%	0.00%	0.00%	0.00%
DEPI	0.00%	0.01%	0.01%	0.00%	DEPI	0.00%	0.01%	0.03%	0.00%	DEPI	0.01%	0.01%	0.12%	0.00%
DESO	0.00%	0.00%	0.00%	0.01%	DESO	0.00%	0.00%	0.01%	0.01%	DESO	0.00%	0.00%	0.00%	0.01%
ELLA	0.26%	0.00%	0.19%	0.39%	ELLA	0.43%	0.00%	0.31%	0.49%	ELLA	0.58%	0.00%	0.28%	0.41%
ERAL	0.00%	0.00%	0.00%	0.00%	ERAL	0.00%	0.00%	0.01%	0.00%	ERAL	0.00%	0.00%	0.01%	0.00%
EROV	0.00%	0.00%	0.00%	0.00%	EROV	0.00%	0.01%	0.03%	0.00%	EROV	0.00%	0.01%	0.03%	0.00%
ERPU	0.07%	0.00%	0.02%	0.01%	ERPU	0.01%	0.00%	0.02%	0.01%	ERPU	0.01%	0.00%	0.15%	0.01%
ERSP	0.02%	0.00%	0.00%	0.23%	ERSP	0.02%	0.00%	0.00%	0.19%	ERSP	0.02%	0.00%	0.00%	0.20%
GRSP	0.00%	0.61%	0.00%	0.00%	GRSP	0.06%	0.46%	0.00%	0.00%	GRSP	0.23%	0.33%	0.00%	0.00%
GUSA	0.00%	0.00%	0.00%	0.00%	GUSA	0.00%	0.00%	0.00%	0.00%	GUSA	0.00%	0.00%	0.00%	0.05%
ERRE	0.49%	0.00%	0.00%	0.00%	ERRE	0.43%	0.00%	0.00%	0.00%	ERRE	0.40%	0.00%	0.00%	0.00%
HAGL	0.00%	0.14%	0.03%	0.19%	HAGL	0.00%	0.25%	0.03%	0.19%	HAGL	0.00%	0.16%	0.03%	0.26%
HOJU	0.00%	0.00%	0.00%	0.01%	HOJU	0.00%	0.00%	0.00%	0.00%	HOJU	0.00%	0.00%	0.00%	0.00%
IPCO	0.00%	0.00%	0.00%	0.00%	IPCO	0.00%	0.00%	0.01%	0.00%	IPCO	0.00%	0.00%	3.52%	0.00%
IVAX	0.00%	0.00%	0.00%	0.03%	IVAX	0.00%	0.00%	0.00%	0.05%	IVAX	0.00%	0.00%	0.00%	0.07%
KOSC	0.00%	0.00%	0.00%	1.86%	KOSC	0.00%	0.00%	0.00%	1.95%	KOSC	0.00%	0.00%	0.00%	1.84%
KRLA	0.00%	0.00%	1.14%	0.01%	KRLA	0.00%	0.00%	1.23%	0.00%	KRLA	0.00%	0.00%	1.23%	0.10%
LASQ	0.01%	0.00%	0.00%	0.00%	LASQ	0.01%	0.00%	0.00%	0.00%	LASQ	0.01%	0.00%	0.00%	0.00%
Lava	6.75%	0.00%	0.00%	0.03%	Lava	6.26%	0.00%	0.00%	0.07%	Lava	5.24%	0.00%	0.00%	0.03%
LEPE	0.00%	0.00%	0.05%	0.02%	LEPE	0.00%	0.00%	0.05%	0.01%	LEPE	0.00%	0.00%	0.05%	0.02%
LEPU	0.00%	0.00%	0.07%	0.08%	LEPU	0.00%	0.00%	0.13%	0.12%	LEPU	0.00%	0.00%	0.19%	0.18%

Table F-1. (continued).

Quarter Plots					Half Plots					Whole Plots				
Sum of Average Quarter Plot	Area				Sum of Average Half Plot	Area				Sum of Average Whole Plot	Area			
Species	1REF	2REF	ORD	TRA	Species	1REF	2REF	ORD	TRA	Species	1REF	2REF	ORD	TRA
Litter	20.57%	22.78%	26.35%	20.05%	Litter	19.69%	22.53%	24.45%	19.44%	Litter	20.39%	20.56%	20.69%	18.81%
LUHO2	0.00%	0.00%	0.00%	0.08%	LUHO2	0.00%	0.00%	0.00%	0.03%	LUHO2	0.00%	0.00%	0.00%	0.03%
LUWY	0.00%	0.00%	0.00%	0.55%	LUWY	0.00%	0.00%	0.00%	0.43%	LUWY	0.00%	0.00%	0.00%	0.40%
LYSP	0.00%	0.00%	0.00%	0.13%	LYSP	0.00%	0.00%	0.00%	0.12%	LYSP	0.00%	0.00%	0.00%	0.06%
MACA	0.00%	0.07%	0.08%	0.03%	MACA	0.00%	0.08%	0.03%	0.03%	MACA	0.00%	0.17%	0.03%	0.03%
MECA	0.00%	0.00%	0.00%	0.00%	MECA	0.06%	0.00%	0.00%	0.00%	MECA	0.01%	0.00%	0.00%	0.00%
MESA	0.00%	0.00%	0.00%	0.00%	MESA	0.00%	0.00%	0.00%	0.00%	MESA	0.00%	0.00%	0.00%	0.00%
Microflora	0.00%	3.13%	0.00%	0.00%	Microflora	0.00%	3.94%	0.00%	0.00%	Microflora	0.00%	4.27%	0.00%	0.00%
Moss	1.25%	5.01%	4.42%	1.23%	Moss	1.65%	4.51%	4.92%	1.43%	Moss	1.69%	4.84%	4.14%	1.51%
OPPO	0.59%	1.03%	0.44%	0.75%	OPPO	0.88%	1.18%	0.50%	0.70%	OPPO	1.27%	1.15%	0.77%	0.59%
ORHY	0.48%	1.14%	0.34%	0.75%	ORHY	0.68%	1.19%	0.49%	0.92%	ORHY	0.60%	1.49%	1.44%	1.18%
PASM	4.76%	0.18%	4.01%	0.94%	PASM	5.32%	0.22%	4.17%	1.39%	PASM	6.25%	0.29%	4.62%	1.43%
Pebbles	3.29%	0.74%	5.23%	22.10%	Pebbles	2.91%	0.73%	5.24%	20.78%	Pebbles	3.15%	0.66%	4.56%	20.12%
PHHO	0.80%	0.11%	0.85%	0.83%	PHHO	0.79%	0.35%	1.27%	1.27%	PHHO	0.84%	0.30%	1.26%	1.04%
PHLO	0.00%	0.00%	0.24%	0.24%	PHLO	0.00%	0.00%	0.32%	0.33%	PHLO	0.01%	0.00%	0.38%	0.37%
POSE	1.40%	0.00%	0.92%	2.05%	POSE	1.70%	0.00%	0.87%	2.05%	POSE	1.88%	0.00%	0.57%	2.30%
PSSP	0.00%	0.02%	0.00%	0.04%	PSSP	0.00%	0.12%	0.00%	0.04%	PSSP	0.00%	0.11%	0.00%	0.03%
RUOC	0.01%	0.00%	0.00%	0.00%	RUOC	0.02%	0.00%	0.00%	0.00%	RUOC	0.03%	0.00%	0.00%	0.00%
SAKA	0.00%	1.23%	0.22%	1.30%	SAKA	0.00%	1.24%	0.24%	1.30%	SAKA	0.00%	1.41%	0.20%	1.43%
Sand	0.00%	0.00%	0.00%	1.49%	Sand	0.00%	0.00%	0.00%	1.45%	Sand	0.00%	0.00%	0.00%	1.48%
SCLI	0.00%	0.01%	0.29%	0.00%	SCLI	0.00%	0.05%	0.37%	0.00%	SCLI	0.00%	0.28%	0.43%	0.00%
SELA	0.00%	0.00%	0.00%	0.00%	SELA	0.01%	0.00%	0.00%	0.00%	SELA	0.01%	0.00%	0.00%	0.00%
SIAL	0.10%	0.00%	0.00%	0.00%	SIAL	0.04%	0.00%	0.00%	0.00%	SIAL	0.04%	0.00%	0.00%	0.05%

Table F-1. (continued).

Quarter Plots					Half Plots					Whole Plots				
Sum of Average Quarter Plot	Area				Sum of Average Half Plot	Area				Sum of Average Whole Plot	Area			
Species	1REF	2REF	ORD	TRA	Species	1REF	2REF	ORD	TRA	Species	1REF	2REF	ORD	TRA
SIHY	0.59%	4.81%	0.22%	1.50%	SIHY	0.63%	4.98%	0.21%	1.76%	SIHY	0.89%	5.38%	0.27%	1.78%
SPMU	0.18%	0.00%	0.04%	0.24%	SPMU	0.13%	0.00%	0.10%	0.21%	SPMU	0.19%	0.00%	0.14%	0.22%
STCO	9.53%	0.45%	0.41%	2.40%	STCO	8.84%	0.59%	0.49%	3.08%	STCO	7.85%	0.87%	0.64%	3.03%
STSP	0.00%	0.00%	0.00%	0.13%	STSP	0.00%	0.00%	0.00%	0.07%	STSP	0.00%	0.00%	0.00%	0.06%
STVI	0.00%	0.00%	0.03%	0.00%	STVI	0.00%	0.00%	0.03%	0.00%	STVI	0.00%	0.00%	0.03%	0.00%
TECA	0.38%	0.38%	0.00%	0.00%	TECA	0.53%	0.26%	0.00%	0.00%	TECA	0.56%	0.13%	0.00%	0.00%
TESP	0.00%	0.90%	0.28%	0.00%	TESP	0.00%	0.72%	0.21%	0.00%	TESP	0.00%	0.45%	0.22%	0.00%
TRDU	0.01%	0.00%	0.00%	0.00%	TRDU	0.01%	0.00%	0.00%	0.00%	TRDU	0.04%	0.00%	0.00%	0.00%

Table F-2. Plant codes, common names, and scientific names.

Code	Common name	Scientific Name
AGCR	Crested wheatgrass	*Agropyron cristatum*
ALAL	Yellow alyssum	*Alyssum alyssoides*
ALDE	Desert madwort	*Alyssum desertorum*
ARCA	Silver sagebrush	*Artemisia cana*
ARCO	Ballhead sandwort	*Arenaria congesta*
ARFR2	Sandwort	*Arenaria franklinii*
ARTR	Wyoming big sagebrush	*Artemisia tridentata*
ASFI	Locoweed	*Astragalus filipes*
ASLE	Freckled milkvetch	*Astragalus lentiginosus*
ATCO	Spiny saltbush	*Atriplex confertifolia*
ATFA	Saltsage	*Atriplex falcate*
BASA	Arrowleaf balsamroot	*Balsamorhiza sagittata*
BRTE	Cheatgrass	*Bromus tectorum*
CADO	Douglass' sedge	*Carex douglasii*
CHDO	Dusty maiden	*Chaenactis douglasii*
CHNA	Grey rabbitbrush	*Chrysothamnus nauseosus*
CHVI	Green rabbitbrush	*Chrysothamnus viscidiflorus*
CRAC	Hawksbeard	*Crepis acuminata*
CRTO	Cryptantha	*Cryptantha torreyana*
DEPI	Western tansymustard	*Descurainia pinnata*
DESO	Tansymustard	*Descurainia sophia*
ELLA	Thickspike wheatgrass	*Elymus lanceolatus*
ERAL	Stalked fleabane	*Erigeron algidus*
EROV	Cushion buckwheat	*Eriogonum ovalifolium*
ERPU	Shaggy fleabane	*Erigeron pumilus*
ERSP	Great basin wooly star	*Eriastrum sparsiflorum*
GRSP (ATSP)	Spiny hopsage	*Grayia spinosa*
GUSA	Broom snakeweed	*Gutierrezia sarothrae*
ERRE	Stemless mock goldenweed	*Ericameria resinosa*
HAGL	Halogeton	*Halogeton glomeratus*
HOJU	Foxtail barley	*Hordeum jubatum*
IPCO	Ball-head gilia	*Ipomopsis congesta*

Table F-2. (continued).

Code	Common name	Scientific Name
IVAX	Poverty weed	*Iva axillaris*
KOSC	Kochia	*Kochia scoparia*
KRLA	Winterfat	*Eurotia lanata*
LASQ	Stick-tights	*Lappula squarrosa*
LEPE	Clasping peppergrass	*Lepidium perfoliatum*
LEPU	Prickly phlox	*Leptodactylon pungens*
LUHO2	Silvery lupine	*Lupinus holosericeus*
LUWY	Wyeth's lupine	*Lupinus wyethii*
LYSP	Spiny skeletonweed	*Lygodesmia spinosa*
MACA	Hoary aster	*Machaeranthera canescens*
MECA	Idaho bluebells	*Mertensia campanulata*
MESA	Alfalfa	*Medicago sativa*
OPPO	Prickly pear cactus	*Opuntia polycantha*
ORHY	Indian ricegrass	*Oryzopsis hymenoides*
PASM	Western wheatgrass	*Pascopyrum smithii*
PHHO	Hood's phlox	*Phlox hoodii*
PHLO	Longleaf phlox	*Phlox longifolia*
POSE	Sandberg bluegrass	*Poa secunda*
PSSP	Bluebunch wheatgrass	*Pseudoroegneria spicata*
RUOC	Western dock	*Rumex occidentalis*
SAKA	Russian thistle	*Salsola kali*
SCLI	Plains mustard	*Schoenocrambe linifolia*
SELA	Spearleaf stonecrop	*Sedum lanceolatum*
SIAL	Tumble mustard	*Sisymbrium altissimum*
SIHY (ELEL)	Squirrel tail grass	*Elymus elymoides*
SPMU	Globemallow	*Sphaeralcea munroana*
STCO	Needle and thread grass	*Stipa comata*
STSP	Thorn skeletonweed	*Stephanomeria spinosa*
STVI	Green princesplume	*Stanleya viridiflora*
TECA	Grey horsebrush	*Tetradymia canescens*
TESP	Spiny horsebrush	*Tetradymia spinosa*
TRDU	Yellow salsify	*Tragopogon dubius*